

THE PHYSICAL DISABILITY OF TEACHERS IN THE WHITE ELEMENTARY SCHOOLS OF BALTIMORE, MARYLAND

A DISSERTATION

SUBMITTED TO THE BOARD OF UNIVERSITY STUDIES OF THE
JOHNS HOPKINS UNIVERSITY IN CONFORMITY WITH
THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

1934

BY

ANITA SHEMWELL DOWELL

(Reprinted from "The Johns Hopkins University Studies
in Education," Number 24)

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TO THE MEMORY OF
MY MOTHER AND FATHER

WHO FOUND PLEASURE IN THE ACQUISITION OF KNOWLEDGE,
AND WHO MADE THE WAY OF STUDY
POSSIBLE FOR ME

ACKNOWLEDGMENTS

To Dr. Florence E. Bamberger, Professor of Education of The Johns Hopkins University, I am most grateful for the suggestion of the subject of this research and for her generous guidance during my work. I am also deeply indebted to Dr. David E. Weglein, Superintendent of Public Instruction of Baltimore, Maryland, and to his staff for so kindly making the records of the Board of School Commissioners available for my use. To Dr. John M. Stephens, of The Johns Hopkins University, and to Dr. Arthur W. Hedrick, of the School of Hygiene and Public Health, The Johns Hopkins University, I especially wish to express my sincere appreciation for invaluable suggestions on the statistical problems involved in this study and for advice so kindly given during the writing of the manuscript. Others whom I wish to thank are Miss Frances R. Dearborn; Dr. Lowell J. Reed and Miss Helen Atwood of the School of Hygiene and Public Health, The Johns Hopkins University, for their able assistance; and Dr. Lida Lee Tall, President of the State Teachers College at Towson, for unfailing interest in this undertaking.

A. S. D.

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CHAPTER I

PREVIOUS STUDIES ON THE HEALTH OF TEACHERS

1. The Importance of the Problem

Administrators of the public elementary school system have long recognized that the illness of teachers in the elementary schools is a liability, both from the standpoint of expense and from that of efficient results. For these reasons Boards of Education in many places have endeavored to provide the schools with healthy teachers and to this end they have made strict regulations concerning the health of candidates for the profession. Some of the teacher training schools¹ require careful medical and physical examinations of entering students and eliminate those with certain defects or diseases which the Board of Education considers handicaps to elementary teaching. For teachers in service, Boards of Education have set up regulations regarding the absences of teachers from school because of illness. The great variety of these rules² shows how widely the opinions of the various Boards differ in respect to the extent, the frequency and the duration of illness among teachers. Some Boards give short leave for illness with full salary; others require some loss of salary for one or more days of absence due to illness. Regulations in respect to longer periods of illness also vary, beginning with what constitutes a long illness. There is also much difference in the amount of time that a teacher must be away from school before the salary is entirely withheld and before the teacher is no longer considered an employee of the system. It seems probable that, if there were accurate information concerning the effect of teaching in the elementary school

¹ Appendix, A. Regulations of the State Teachers College at Towson, Maryland.

² Englehardt, Fred, *Public School Organization and Administration*. New York: Ginn and Company, 1931, pp. 215-216.

Carrothers, J. E., *The Physical Efficiency of Teachers*, New York; Teachers College, Columbia University, 1924, Contribution to Education, No. 155, Chapter IV.

Research Bulletin of the National Education Association. Washington, D. C.: National Education Association, 1928. Chapter VI, No. 4.

upon the health of teachers, such diversity of regulations in respect to illness would not be necessary.

In general two values accrue to Boards of Education from exact information concerning the illnesses of teachers; first, accurate information can determine the influence of environmental and other factors, inherent in teaching, itself, in causing illness. Since much sickness is preventable, this knowledge can serve as a basis for remedying, controlling or minimizing such illness. Second, an understanding of the amount, of the frequency and of the duration of illness affords a basis upon which to set up regulations in respect to absences due to illness, and even regulations concerning the appointment and the retirement of teachers.

When one attempts to understand the effect of teaching in the elementary school upon the health of teachers, certain questions which have to do with the environment of the teacher and with the factors inherent in the profession itself arise, such as, to what extent does the age of the teacher contribute to the amount of illness, to the number of times one is ill, and to the length of one's periods of illness? Does the teaching of any grade require greater effort and so cause more illness than the teaching of some other grade? In school systems, for instance, the teaching of first grade has frequently been considered particularly difficult. Does a high salary indicate less illness? Does administrative work cause greater strain and hence more illness than classroom teaching? Does the effort to attain promotion increase the illness rate? Does marriage have an affect upon the teacher's amount of illness? Does the location of the school in a quiet or noisy section influence the health of the teacher? Does the size of the school, that is, contact with a large number of teachers and pupils in the larger schools, or the necessary complexity of administrative duties which teachers must assume in the smaller plants produce strain and so cause excessive illness? These are a few of the questions only that accurate information on the sickness situation of teaching can help solve. To secure such information and to provide material for intelligent action in handling the factors that affect

the health of teachers statistical knowledge of the teacher's reactions to conditions, characteristic of the profession, is necessary.

2. A Survey of the Literature

Some investigations of the health of teachers have been made previous to this study. The earliest of these studies seems to have been made by J. Y. Hart ³ when he investigated the sickness data of elementary teachers of London, for the years 1904-1919. He says of his study, "I have been unable to find any previous investigation of this nature of the sickness of teachers." Hart determined the principal ailments from which teachers suffer, the effect of the World War on the frequency, the duration and the extent of absence due to illness and the influence of age, sex and the nature of the school district upon absence. He ⁴ concludes that sex is a most important factor in the illness of teachers. He found that the mean illness of men was 4.6 days per teacher per year for the period 1904 to 1919 and the corresponding figures for single and married women were 8.2 and 9.3 respectively. His figures in determining the influence of age on the extent of illness show that the mean illness for men increases from 4.3 days a year for those twenty-one to twenty-five years of age to 9.2 days a year for those sixty-one to sixty-five years old; the corresponding figures for single and married women of the two age groups are 6.4 to 19.1 days for single women and 11.1 to 19.6 for married women. In his analysis of the causes of illness Hart found that respiratory diseases account for 43 per cent of the total illness, nervous and mental complaints 16.5 per cent and contagious diseases 3.8 per cent.

In 1916 Louis I. Dublin ⁵ stated concerning the physical disability of New York City teachers that 18.7 per cent reported themselves sick during the school year; that the

³ Hart, J. Y., "An Investigation of the Sickness Data of Elementary School Teachers in London, 1904-1919," *Journal of the Royal Statistical Society*, LXXXV, Pt. III (May 1922), p. 349.

⁴ Hart, J. Y., *op. cit.*, p. 385.

⁵ Dublin, L. I., *The Physical Disability of Teachers*. New York: Metropolitan Life Insurance Company, 1916, pp. 4, 6-8.

average number of days' illness during the school year 1914-1915, including both men and women, was 2.88; that the sickness rate increases with age; for instance, the rate for the age period 20-24 is 126.3 per 1,000 cases with a continuous increase for each ten year period until the age period 55-64 is reached for which the rate is 256.0 cases. He says of the New York teachers, "Among female teachers the rates are increasingly higher with advancing age except at the very earliest and the most advanced ages, when the number exposed is small."

In his study of the New York teachers, Dublin ⁶ found that the average duration of illness for the age period 20-24 is 1.25 and 1.61 per teacher for men and women respectively; for the age period 45-54, the averages are 1.70 and 4.80 per teacher, and for teachers between fifty-five and sixty-four years, it is over five days per female teacher.

"The leading causes of disability among men school teachers were influenza 20.8 per cent, and tonsillitis 6.9 per cent. There were in addition 6 cases of pulmonary tuberculosis and 7 cases of neurasthenia and nervous exhaustion. . . . Among women teachers the principal diseases and conditions identified were influenza 20.3 per cent, tonsillitis 10.9 per cent, neurasthenia and nervous exhaustion 8.8 per cent, acute and chronic bronchitis 6.8 per cent, accidents, injuries or other external causes 3.8 per cent, gastritis and other diseases of the stomach 3.7 per cent."

In 1924 G. E. Carrothers ⁷ published an investigation of the illness of public school teachers in Springfield, Massachusetts, and Cleveland, Ohio. Among Carrothers conclusions are the following:

1. That 21.3 per cent of the women teachers and 46.88 per cent of the men in Cleveland schools had no absences due to illness for 1922-1923.
2. That 72.22 per cent of the women and 81.75 per cent

⁶ Dublin, L. I., *op. cit.*, pp. 10-11.

⁷ Carrothers, G. E., *The Physical Efficiency of Teachers*, Contribution to Education, No. 155. New York: Teachers College, Columbia University, 1924, pp. 63-64; 27, 35, 75.

of the men in Springfield had no absences due to illness for 1922-1923.

3. That the average number of days ill per teacher for men and women in the Cleveland schools for a period of five years was 2.20 and 5.03 days respectively.
4. That the average number of times ill per teacher for men and women in the Cleveland Schools for a period of five years was .73 and 1.78 respectively.
5. That married women teaching in the Cleveland Schools for a period of one year had $6.619 \pm .216$ days of illness per teacher whereas the single women teachers had $5.053 \pm .092$ per teacher.
6. That "Such teaching factors as size of classes, type of school, teaching in foreign or in congested sections, age, experience, salary, years of education, and the like, which have ordinarily been associated with physical strain, bear no significant relation to the number of days of sick leave taken each year."

Carrothers used the coefficient of correlation to test the relationship between each of the factors mentioned above and the amount of illness.

J. F. Rogers'⁸ comprehensive survey of previous studies on the health of teachers, published in 1926, compared the amount of absence of teachers due to illness and the nature of illness with that of employees in other occupations. He⁹ showed that the total average amount of illness for men among the white teachers was 1.50 days and for women 3.49 days, whereas the total average for men in other occupations was 3.39 days and for women 8.40, including post office workers; without the latter, the average was 6.33 days. In his study of the nature of illness, Rogers states that for respiratory diseases the percentage among men who taught was 35.5 and among men in other occupations it was 47.5; for respiratory diseases among women teachers and among

⁸ Rogers, J. F., *The Health of the Teacher*, School Health Studies, No. 12. Washington, D. C.: Department of the Interior, Bureau of Education, 1926.

⁹ Rogers, J. F., *op. cit.*, pp. 6, 10-11.

women in other occupations the percentage was 43.8 and 47.3 respectively; for digestive diseases the percentage among men teachers was 8.0 and among men in other occupations 15.5; for digestive diseases for women teachers the percentage was 7.0 and for woman in other occupations 14.6. Rogers' comparison of the percentage of cases of mental diseases and neurasthenia of teachers with workers in other occupations does not result favorably for the teachers, for instance, the proportion of cases of neurasthenia and nervous exhaustion among the New York City teachers was 3 per cent for men and 8.8 per cent for women; whereas for the Hood Rubber Company "neurasthenia and nervousness caused 0.3 per cent of the absences of men and 1.3 per cent of those of women."

James Kerr¹⁰ discusses the health of the teacher in "The Fundamentals of School Health." He quotes figures from the school records of Dresden, Leipzig and from Hart's study to show the physical efficiency of teachers. In addition he enumerates physical defects, such as, tuberculosis and neurasthenia which he feels should bar individuals from the profession.

A monograph, "The Teacher's Health," published by the Metropolitan Life Insurance Company¹¹ quotes briefly from previous studies on the health of teachers. The monograph is not dated, but the bibliography which it gives includes publications dated as late as 1927. E. W. Anderson,¹² in the "Review of Educational Research," presents a very complete list of studies and reports on the health of teachers.

¹⁰ Kerr, James, *The Fundamentals of School Health*. New York: The Macmillan Company, 1927. Chapter 36.

¹¹ Metropolitan Life Insurance Company, *The Teacher's Health and What Some Communities are Doing to Conserve It*, Monograph No. 4. New York: Metropolitan Life Insurance Company.

¹² Anderson, E. W., "Health of the Teacher," *Review of Educational Research* 1, No. 2. Washington, D. C.: National Education Association, April 1931, pp. 111-114, 153-154.

CHAPTER II

THE PROBLEM AND THE PLAN

I. The Problem

The present study attempts to examine two aspects of the absences of teachers due to personal illness during six years of teaching in the white elementary schools of Baltimore, Maryland, and a derivative of these aspects of illness. The two aspects of the absences of teachers due to illness are:

1. the amount of illness, and
2. the frequency of illness

The *amount of illness* is the total days a teacher is absent from school due to illness, or, more exactly, the mean number of days of illness for each teacher per school year. The *frequency of illness* is the mean number of times a teacher is ill per school year.

The derivative of the amount and of the frequency of illness, with which this investigation also deals, is the duration of illness. The *duration of illness* is considered from two angles:

1. the mean length of illness per teacher per school year,
i. e.,

$$\frac{\text{the number of days ill}}{\text{the number of times ill}}$$

It will be seen that the mean length of illness for each teacher is the ratio of the amount of illness to the frequency of illness.

2. the actual duration of the periods of illness per teacher during the six year period. This distribution, or scatter, of the duration of illness is the actual length in days of each of an individual's illnesses.

The definitions of the amount, of the frequency and of the duration of illness will be more fully discussed in the sections of this study devoted to the statistical treatment of each of these aspects.

In addition to analyzing the amount, the frequency, and their derivative, the duration of illness, this study also undertakes to determine the relation of certain factors to the amount, the frequency and the duration of illness of teachers in the white elementary schools. These factors are:

- The month of the year
- The age of the teacher
- The experience of the teacher
- The teacher's salary
- The grade taught
- Promotion before the study
- Promotion during the years of the study
- Marital status

Some of the above factors are among those that Carrothers¹ examined in his study of the health of teachers. Carrothers, however, employed a way of testing the relation of these factors to the illness data that does not give a complete picture of the relationship. He used the coefficient of correlation as a measure of relationship, without determining whether or not the data approached linearity.

Some of Carrothers' ² tables, such as, Tables 2, 6, 7, 8, 9, 12, 13 have not been proved linear and do not appear so, since it is true, that, when the means of the arrays do not lie fairly closely on a straight line, the regression is non-linear, and the correlation coefficient, which is applicable when the traits have a linear relationship only, will give an understatement of the degree of association.³ In addition to the understatement of the degree of association that the correlation coefficient gives, such treatment of the data does not present statistically the nature of the high or low correlation between the factors selected for study and the illness data. In the present study the distributions of the illness data with the various factors were tested, first of all, to determine if they approached linearity. In those distributions

¹ Carrothers, G. E., *The Physical Efficiency of Teachers*, Contribution to Education, No. 155. New York: Teachers College, Columbia University, 1924.

² *Ibid.*, pp. 11, 21, 22, 25, 26, 28, 29.

³ Holzinger, K. J., *Statistical Methods for Students in Education*. New York: Ginn and Company, 1928, p. 177.

where this was not the case, it was necessary to use the correlation ratio (Eta) which indicates the amount of relationship present irrespective of linearity.

To summarize, the problem of this study attempts:

1. To determine the amount and the frequency of disabling sickness among teachers in the white elementary schools of Baltimore, and
2. To investigate the relation of certain factors to the absences of teachers presumably due to personal illness. These factors are the time of the year, age, experience, salary, grade taught, promotion before and during the years of the study, and marital status.

2. The Plan

In brief, the solution of the problem requires:

1. A record of the amount of absence stated as due to personal illness, and the number of times these absences occur for each teacher.
2. A record of the above absences by years and months.
3. Complete data on the various factors to be examined, as age, experience, salary, grade taught, location of school and size of school ⁴ for each teacher during the years of the study.
4. Records of the professional and marital status of each teacher.
5. A comparison of the amount, of the frequency and of the duration of absence by age groups.
6. A comparison of the amount of absence and the number of teachers absent by months.
7. A comparison of the actual duration of illness by age groups.
8. The analysis of the influence of certain factors,—age, salary, experience, grade taught, professional and marital status, upon the amount, the frequency and the duration of absences due to illness.

⁴ The study of the two factors, the location and the size of school, was abandoned since the data finally accumulated were too limited to be considered reliable. Page 12.

CHAPTER III

THE MATERIALS OF THE STUDY

I. Sources of Information

The sources of the data used in this study were various records filed in the administrative offices of the Board of Education of Baltimore, Maryland. These records comprised the general records of teachers, principals' monthly reports, principals' special reports and absence records of teachers. The data of these records were transcribed on cards each of which was designated for one individual. Thus it was possible from these sources to record for each teacher the number of days of absence due to illness by months and years, to indicate the number of times absent, and also to record the age, sex, years of experience, marital status, location of school by years and size of class and grade by years.

Conferences with members of the Department of Superintendence and of the Bureau of Statistics, and with supervisors and other officers in the Department of Education of Baltimore City aided in interpreting the data. The directories¹ of teachers were useful in locating teachers, and the rules and regulations² of the Board of School Commissioners gave information in regard to sick leave. Some information that had to do with the transfer of teachers from Baltimore County to the City in 1919, after the Annexation,³ came from the office of the Baltimore County Department of Education and facts concerning the location of schools were furnished by The Zoning Commission of Baltimore City.

¹ *Directories of the Public Schools of Baltimore, Maryland, for years 1924-1930.*

² *Rules of the Board of School Commissioners, Department of Education, Baltimore, Maryland, 1927.*

³ *Laws of the State of Maryland, 1918, King Brothers, State Printers, Chapter 82, pp. 135-152.*

2. The Selection of Teachers

In order to secure a fairly homogeneous group for study those teachers were selected who were teaching in the white elementary schools of Baltimore City as distinct from those teaching in any of the Negro schools and as distinct from those teaching in the white junior and senior high schools. Besides these criteria for the selection of teachers, there were several additional factors that determined the final choice of the individuals studied.

First of all, the teachers chosen, were those who were continuously identified with the white elementary schools for the six year period, from September 1924 to June 1930. This permitted those teachers who were on leave for personal illness, but whose names were on record as teachers of particular schools, to be retained.

Second, those teachers who died, resigned or retired during this six year period were eliminated though they might have spent the major portion of the six year period in the schools.

Third, those married teachers who had maternity leave of absence were discarded. The Board of School Commissioners requires teachers who are expectant mothers to apply for a leave⁴ of two years. Since these teachers cannot return to teaching positions in the system until the expiration of the two years, such compulsory leave could not be classed as personal illness.

Fourth, the number of men among the total number of teachers finally selected was so small, fifteen in all, that they, too, were dropped. These several eliminations reduced the number of teachers to 921.

It was necessary to make even further reduction in this total number of 921 teachers for the study of the relation of the factors,—age, experience, salary and grade,—to the absences of teachers due to illness. In selecting individuals for the study of the factor of grade, those teachers were chosen who had taught either kindergarten, first grade,

⁴ *Rules of the Board of School Commissioners, Baltimore, Maryland, 1927, p. 30.*

second and third grades, or intermediate grades continuously from September 1924 to June 1930. Teachers were eliminated who during the six year period had transferred from one grade to another or who had taught combinations of grades that overlapped the grouping of the grades given above, such as, one who taught first and second grade or third and fourth grades together. Principals and vice-principals, since they did not teach, also had to be excluded. The eliminations for the factor of grade taught reduced the number of individuals from 921 to 674. Therefore, in analyzing the relation of the factors of age, salary and grade to absence due to illness, the 674 cases were studied. A minor qualification⁵ in dealing with the factor, experience, which will be referred to later, further reduced the number of individuals for the study of this factor. The 921 cases, however, were used for the study of the amount of illness, the number of times ill, the duration of illness, the distribution of the actual duration of illness and the seasonal distribution of illness.

The subdividing of the number of teachers so that the location and size of schools could be held constant for an individual during the six year period reduced the total number of individuals to such an extent that the figures were considered too small to be reliable. The study of these two factors, therefore, was abandoned.

Thus, the experimental material was limited to:

1. Teachers in the white elementary schools
2. Teachers who were continuously identified with the Baltimore City School System for the six school years from September 1924 to June 1930.
3. Female teachers
4. Those married teachers only, among the female teachers, continuously identified with the white elementary schools, who were not on maternity leave.
5. Those teachers only from the total number who taught continuously in the kindergarten, the first grade, the second and third grades, or the intermediate grades for

⁵ Page 18.

the analysis of the relation of age, of salary, of experience and of grade taught to the absence of teachers due to personal illness.

3. The Definition of Illness

Principals of the elementary schools report the absences of their teachers in their monthly statements to the superintendents and tell in general the reasons for these absences. The reasons for absence that one commonly finds on these reports are personal illness, business, religious holidays, observation in other schools and death in the family. From the absences for these various reasons those designated as due to personal illness have been selected to furnish the fundamental data of this study. These absences may include accidents, as well as sickness, for in most of the principals' reports the kind of illness is not stated. It is occasionally only that a principal writes the name of some disease in connection with the statement of personal illness.

It is quite true, that, since it depended upon the teachers to report themselves as ill, they may vary greatly in their amount of absence due to minor illnesses. One teacher may have attended school with an ailment for which another would have remained away for several days. Since the Board of Education requires no medical report on illness until a teacher has been absent five days, it is impossible to secure more exact information than that of the principals' reports. On the other hand, the ruling ^a of the Board of School Commissioners that a teacher should lose one half of her salary for each day when absent because of personal illness, does not encourage teachers to remain at home unnecessarily and principals must be exact in recording absence, especially since a substitute is called to take the place of an absent teacher.

Illness, defined, then, for this study, signifies the absence of a teacher from school which has been reported as due to personal illness.

^a *Directory of the Public Schools of Baltimore, Maryland, 1922, p. 270.*

4. The Characteristics of the Material

*a. Distribution of Teachers by Age*TABLE 1
DISTRIBUTION OF 921 TEACHERS BY AGE *

Age	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	Total
Number of Teachers	100	135	132	80	70	88	134	106	63	13	921

* Age is recorded as that at the mid point of the six year period.

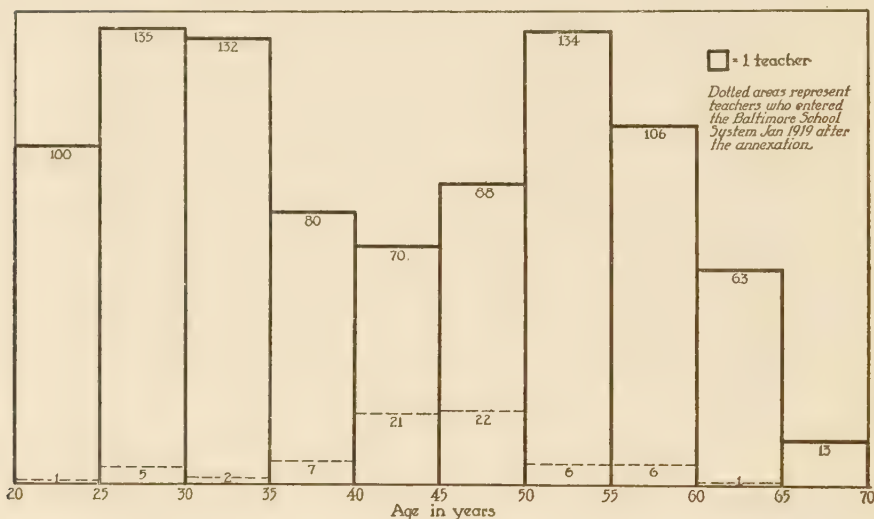


Figure 1. Distribution of 921 teachers by age for six year period

TABLE 2
DISTRIBUTION OF 674 TEACHERS BY AGE *

Age	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	Total
Number of Teachers	75	100	94	56	44	65	104	79	47	10	674

* Age is recorded as that at the mid point of the six year period.

Tables 1 and 2 (*see Figure 1*), show a bimodal curve for the distribution of teachers by age. One would expect for the

distribution of teachers by age a positively skewed curve, i. e., a curve with its peak in the younger age group and a gradual decrease in numbers in the older age groups.

Though the purpose of this study is to investigate the absences of teachers due to personal illness and though it is not in its field to explain the reasons for such a distribution by age as is found here, yet it seems of interest to consider briefly some of the possible factors that might tend to cause the bimodal appearance of the curve. The bimodal curve for the distribution of teachers by age cannot be explained by the selection of individuals for this study, since H. B. Chapman⁷ plots a similar curve for all the teachers in the white elementary schools of Baltimore in 1929, one of the years of this study. This kind of curve, then, appears to be characteristic of the teachers in the white elementary schools in Baltimore. One of the explanations offered for this type of age distribution is marriage and resignation from the system. Marriage and resignation could account for the decrease in teachers in the middle age groups, but it does not account for the large numbers in the fifty and sixty age groups. In this connection also the question arises,—do most teachers marry when between thirty-five and forty years old rather than at a younger age? A study of the Baltimore County teachers who came into the city at the time of the Annexation⁸ in 1919 throws no light upon this subject. It was thought that there may have been a preponderance of the older teachers in this group. The areas enclosed by dotted lines in Figure 1 give the distribution by age of the teachers who came into the Baltimore school system when their schools in the annexed territory were admitted. The majority of these teachers were between forty and fifty years of age at the time of this study, so they did not increase the number in the fifty to sixty age group.

There are three facts, however, that seem to help explain the bimodal appearance of this curve. First, since the World

⁷ Chapman, H. B., *The Teaching and Supervisory Personnel in the Baltimore Public Schools*. Baltimore: Bureau of Research, Department of Education, September 20, 1929, p. 28.

⁸ *Laws of the State of Maryland*, 1918, Chapter 82, pp. 135-152.

War the enrollment of the junior and senior high schools has increased greatly and a larger number of teachers has been needed for such schools. Teachers graduating from normal school at around the age of twenty are not eligible for positions in high school until they have credit for further education, so a number of normal school graduates teach in the elementary schools while fitting themselves for junior high school positions and, after some years of elementary school teaching, transfer to such positions. For the reasons stated above the teachers in the older age groups did not have this opportunity of leaving the elementary school for high school positions. Second, the Board of School Commissioners of Baltimore City reports that, for around seventeen years previous to 1924 which is the first year of this study, there were not sufficient trained teachers and it was necessary to fill the positions with substitutes. From the Annual Report ⁹ for the scholastic year ending June 30, 1913 there is the statement, "The greatest and most urgent problem that confronts school administrators is the supply of teachers. . . . The many avenues of professional employment that have opened up to women have not only caused young teachers to leave the work but have decreased the number of students in our training schools. It has been necessary to make use of so-called emergency substitutes in filling vacancies. . . ." The age groups (Figure 1) affected by "young teachers" leaving the work would be the present thirty-five to forty or forty to fifty age groups. The lack of students in the training school, calculating from the average age of graduation (21 years) to the mid point of this six year period, would also reduce the numbers in these groups.

The 1918,¹⁰ 1919,¹¹ and 1920¹² Reports deplore the conditions which have resulted in resignations from the teaching

⁹ *Eighty-Fourth Annual Report of the Board of School Commissioners of Baltimore, Maryland, 1913, p. 45.*

¹⁰ *Eighty-Ninth Annual Report of the Board of School Commissioners of Baltimore, Maryland, 1918, p. 13.*

¹¹ *Ninetieth Annual Report of the Board of School Commissioners of Baltimore, Maryland, 1910, p. 13.*

¹² *Ninety-First Annual Report of the Board of School Commissioners of Baltimore, Maryland, 1920, p. 7.*

staff. There is, however, no statement of the age of teachers resigning. An extract from the Report¹³ of 1921 and 1922 gives an idea of the length of time and difficulty the school system had had in supplying trained teachers for the schools and indicates that older teachers hesitated to make a change in their occupation.

"The war and its aftermath of high prices are only the immediate cause of the conditions that the schools are facing today. For a decade or more before the war, it was clearly apparent that the rewards of teaching were not increasing in proportion to the awards afforded in other callings . . . thousands of high school graduates who in former years would have entered the teaching service were attracted into these new fields." "The unsatisfactory financial status of the teacher has found expression not only in resignations from the teaching service but also in the spirit of unrest on the part of the teachers who . . . have remained in the service either because they . . . believe they should not desert it in a crisis or because they have reached an age when a change of occupation is not something to be considered lightly."

According to these reports, young women did not prepare themselves for elementary teaching for "more than a decade before the war" which would account for the small number of teachers in the thirty-five to forty age groups at the time of this study. Substitutes, who were dropped later, had to be appointed so that all positions could be filled. In addition, the fact that older teachers had reached an age when a change of occupation "could not be considered lightly" accounts for the large number of teachers in the older age groups. During the war and previous to it, when young people were seeking positions other than in the field of teaching, these older teachers had reached an age even at that time when they feared to make a change in their occupation.

The 1925 Report¹⁴ refers to the situation in this way, "It

¹³ *Ninety-Second Annual Report of the Board of School Commissioners of Baltimore, Maryland, 1921 and 1922*, p. 38.

¹⁴ *Ninety-Sixth Annual Report of the Board of School Commissioners of Baltimore, Maryland, 1925*, p. 10.

is particularly gratifying to point out that all positions in the elementary schools are now filled with regular qualified teachers which is in marked contrast to the situation several years ago when several hundred substitutes were occupying these positions." The quotations above from the Reports point to conditions which appear to have been responsible for the trend of the distribution. Third, the fact that around the end of the nineteenth and the beginning of the twentieth centuries teaching was considered one of the few respectable lines of work in which women could engage, had an effect, perhaps, in increasing the numbers of older teachers in this distribution.

b. Distribution of Teachers by Experience

TABLE 3

DISTRIBUTION OF 663 TEACHERS BY EXPERIENCE *

Experience in Years	0-3	4-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Total
Number of Teachers	28	162	85	69	59	60	95	69	32	4	663

* Experience is recorded as that at the mid point during the six years.

Table 3 gives the distribution of 663 teachers by experience. Eleven individuals included in the distribution for age, salary and grade have been omitted from this distribution in order not to distort the data. These eleven persons were older teachers who had transferred to the Baltimore school system from other places, and in meeting the requirements for elementary teachers of Baltimore City they were recorded as having fewer years of experience than it is likely they had had.

c. Experience and Age

The distribution of teachers by experience and age, (*see* Table 4), gives a coefficient of correlation of plus .898. This appears to be a high correlation of the two traits, experience and age. In order to determine, however, the limits outside of which the true value of this coefficient of correlation is not

likely to fall, its probable error has been found. The probable error for r equalling plus .898 is $\pm .0024$. It is evident that the coefficient of correlation is much more than three times its probable error. A correlation of two traits .898 above zero, or greater than no correlation, indicates a high correlation of the two traits. Because of this high correlation between experience and age, age alone will be used in the

TABLE 4

DISTRIBUTION OF 663 TEACHERS ACCORDING TO AGE AND EXPERIENCE

Age	Experience in Years *										Total
	0-3	4-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
20-24	25	50									75
25-29	3	85	12								100
30-34		19	66	9							94
35-39		7	5	41	1						54
40-44				9	32	1	1				43
45-49			1	6	17	35	4				63
50-54		1		2	7	15	68	9			102
55-59				1	2	6	15	49	4		77
60-64			1			2	6	10	26	1	46
65-69				1		1	1	1	2	3	9
Total	28	162	85	69	59	60	95	69	32	4	663

$$r = .898 \pm .0024$$

* The intervals in years of experience are unequal and were so treated in the calculation of the coefficient of correlation.

study of the relationship between illness and age and experience. Even though there is a high correlation between age and experience, it will be seen that the curves for the distribution of teachers by age (*see* Table 2), and by experience (*see* Table 3), are not exact in trend. A glance at Table 4 will explain the differences in these two curves. The scatter in the experience of age groups 20-24 and 25-29 accounts for the large number having from four to ten years experience and the greater amount of scatter in the experience of the older teachers accounts for the further variation in these two distributions.

d. Distribution of Teachers by Salary

TABLE 5
DISTRIBUTION OF 674 TEACHERS BY SALARY ¹⁵

Salary and Number of Teachers										Total
\$1300-	\$1400-	\$1500-	\$1600-	\$1700-	\$1800-	\$1900-	\$2000-	\$2100-	\$2200-	
32	99	27	78	71	235	122	8	1	1	674

The curve for the distribution of teachers by salary (*see* Table 5) shows that 235 teachers are in the salary group of \$1800 to \$1900, the maximum salary for the classroom teacher. The initial salary of the teachers in the Baltimore elementary schools is \$1200 with presumably annual increases up to the maximum of \$1800. Under certain conditions, such as the taking of university courses, which are credited by the Board of Education, this maximum may be increased after it is reached. There are, also, positions of responsibility, such as that of demonstration and training teacher, principal and vice principal, for which there are higher salaries than for classroom teachers. For the school years, 1925-1926, and 1926-1927, there were no regular increases in salary, which makes the average salary of each teacher used here somewhat lower than it would be otherwise. There are many individuals among these 674 teachers whose salary stood at the maximum of \$1800 throughout the years of this study. If the principals who have a higher salary scale than classroom teachers had been retained in this group (*see* p. 12) there would have been more individuals at the upper limits of the curve.

¹⁵ The salary recorded for each teacher in this study is the average salary for the six year period. The salary at the beginning of the study would not include the increases for those promoted during this six year period to better paid positions in the system, and the salaries recorded at the end of the six years only would give a distorted picture of the salaries of promoted teachers as well as figures that would be too low for the non-promoted individuals when compared with the promoted ones.

e. Distribution of Teachers by Grade

TABLE 6

DISTRIBUTION OF 674 TEACHERS BY GRADE

Grade	Kindergarten	First Grade	Second and Third Grades	Intermediate Grades	Total
Number of Teachers	45	107	223	299	674

The greatest number of the 674 teachers studied taught in the second and third and the intermediate grades (*see* Table 6). The selection of teachers who remained in the kindergarten exclusively for six consecutive years makes the number in that group small. This is also true of the first grade group and explains in part why the number of first grade teachers is smaller than that of those teaching the second and third grades. Not only are there two grades included in the second and third grade group, but teachers who transferred from the second to the third grade, or vice-versa, could be retained here. The intermediate grade group includes teachers of four grades: the fourth, the fifth, the sixth and the seventh, and also those teaching combinations of these grades.

CHAPTER IV

THE ANALYSIS OF THE DATA

1. The Amount of Illness

The amount of illness has been defined as the mean number of days of illness for each teacher per school year. The following table, Table 7, illustrates this definition:

TABLE 7
THE AMOUNT OF ILLNESS OF ONE TEACHER

School Years	Number of Days Ill	Mean Number of Days Ill Per School Year
1924-1925	5	
1925-1926	0	
1926-1927	2	
1927-1928	4	
1928-1929	14	
1929-1930	4	
	—	
Total	29	4.83

It will be seen in Table 7 that the number of days of illness for the teacher with whom this table is concerned, varies each school year, for instance, this teacher had five days of illness in 1924-1925, no illnesses in 1925-1926, two days of illness in 1926-1927, and so on, making a total number of twenty-nine days of illness during the six school years. This total number of illness distributed over each of the six school years gives a mean number of 4.83 ($29/6 = 4.83$) days of illness for each school year. This, then, is what is meant in this study by mean or average number of days ill per teacher per year.

Table 8 shows that during the period of six years 11.7 per cent of the total number of teachers have a record of no absences due to illness. Carrothers¹ finds that 46.88 and 21.30 per cent of the women teachers among the Cleveland and Springfield groups respectively had no absences due to illness. His records cover a period of one year only, however, the number of teachers in Cleveland was over three thousand, which seems large enough to prevent errors due to sampling.

¹ Carrothers, G. E., *op. cit.*, pp. 63, 64.

Over twenty-five per cent of the total number of Baltimore teachers (*see* Table 8) have less than six days of illness during the six years, which means that one-fourth of the teachers have an average of less than one day of illness a

TABLE 8

TEACHERS CLASSIFIED BY TOTAL AMOUNT OF ILLNESS FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Days Ill	Number of Teachers	Percent of Total Number of Teachers
— 0.25- + 0.24	79	11.72
0.25- 0.74	3	.45
0.75- 5.74	92	13.65
5.75-10.74	92	13.65
10.75-15.74	65	9.64
15.75-20.74	56	8.31
20.75-25.74	43	6.38
25.75-30.74	35	5.19
30.75-35.74	31	4.60
35.75-40.74	24	3.56
40.75-45.74	18	2.67
45.75-50.74	19	2.82
50.75-55.74	9	1.34
55.75-60.74	14	2.08
60.75-65.74	11	1.63
65.75-70.74	9	1.34
70.75-75.74	6	.89
75.75-80.74	6	.89
80.75 plus	62	9.20
Total	674	100.01

year. Forty-nine per cent, or almost half of the group, have less than sixteen days of illness, which is an average of less than three days a year. Though the number of teachers ill decreases almost continuously as the number of days of illness increases (*see* Figure 2), the number of days of illness has a wide range.

The mean number of days' illness for each teacher per school year for the total population of 921 teachers is 4.99 days (*see* Table 9).

The average of 4.99 days of illness per teacher per school year is deduced from the data for the total period of six years in order to secure a more exact average than a single year might give.



Figure 2. Distribution of 674 teachers by total days illness during six year period

TABLE 9

AVERAGE NUMBER OF DAYS ILL FOR SIX YEAR PERIOD FROM
SEPTEMBER 1924 TO JUNE 1930

Number of Teachers	Number of Days Ill	Number of Days Ill Per Teacher	Mean Number of Days Ill Per Teacher Per School Year
921	27,519	29.88	4.99

TABLE 10

AVERAGE NUMBER OF DAYS ILL BY YEARS

		School Years					
		Days Ill 1924-25	1925-26	1926-27	1927-28	1928-29	1929-30
Total	" "	4173	4454	4631	4559	4353	5414
Average per Teacher	" "	4.53	4.84	5.0	4.95	4.73	5.88

Table 10 gives the average number of days' illness per teacher by years. The highest average was found in the year 1929-1930, though there was no unusual record of epidemics recorded at the health department for the city during this year.

Dr. H. B. Chapman² found that the average number of days' absence per teacher absent from school for teachers in the white elementary schools of Baltimore during the years 1928-1929 was 5.6 days the first semester and 6.6 days the second semester, and for the year 1929-1930, 5.31 days the first semester and 6.73 the second. Chapman's figures include all of the teachers in the white elementary schools during the years designated. The data of the present study, however, cover those teachers who remained in the elementary schools from September 1924 to June 1930. All teachers resigning or withdrawing from the elementary schools for any cause, including poor health, have been eliminated. In addition Chapman's figures cover absences for all causes rather than those for personal illness only, and were deduced on the basis of the teachers absent so, particularly for the latter reasons, it is not surprising that his results are higher than the averages found for illness only in this study.

"The Costs of Sickness,"³ a publication of the Metropolitan Life Insurance Company, asserts "that on the average each person . . . loses somewhat over one week as the result of illness." This average loss is based on data which include both sexes and workers in various fields.

Brundage⁴ in his study of the absences of workers in a large industrial concern estimates that "the average number of days of disabling sickness per wage earner is between seven and nine for a 300-day working year." These data for industrial workers include both sexes and the working year is longer than that for teachers.

² Chapman, H. B., *Statistical Reports for the School Years, 1928-1929, 1929-1930*, p. 10.

³ Metropolitan Life Insurance Company, "The Costs of Sickness," *Health Bulletin for Teachers*, No. 38, February 1933. New York: Metropolitan Life Insurance Company, p. 1.

⁴ Brundage, D. K., "Sickness and Absenteeism during 1919 in a Large Industrial Establishment," *Public Health Reports*, XXXV, Part II, September 10, 1920, p. 2145.

Dublin ⁵ reports that women teachers have an average of three days' illness per teacher as against eight days in the general experience of industrial groups.

Rogers ⁶ states, "The length of the teacher's working year is about two-thirds that of persons in the other occupations for which we have statistics, but it will be noted that even when the number of absences per year of persons in other occupations is divided by this fraction the average yearly absence among the latter is, on the whole, considerably higher than for the teachers."

The mean number of days' illness for teachers in these data, which is 4.99, is consistently low as though teachers are favored for some reason with a higher degree of health than other employees. In a larger population than the 921 Baltimore teachers, the mean number of days' illness would likely be further reduced and so would probably approach more closely the figures given by Dublin for New York City teachers.

2. The Frequency of Illness

The amount of illness has been shown to be concerned with the number of days ill, whereas the frequency of illness gives the number of illnesses that a teacher has during the six year period of this study, but it gives no intimation of the length of each period of illness.

TABLE II
THE FREQUENCY OF ILLNESS FOR ONE TEACHER

School Years	Number of Times Ill	Mean Number of Times Ill Per Year
1924-1925	2	
1925-1926	0	
1926-1927	4	
1927-1928	0	
1928-1929	5	
1929-1930	2	
Total	13	2.17

⁵ Dublin, L. I., *Physical Disability of New York City School Teachers*. New York: Metropolitan Life Insurance Company, 1916, p. 18.

⁶ Rogers, J. F., *op. cit.*, p. 6.

Table 9 illustrates what is meant by the mean number of illnesses per teacher. The teacher, whose record of the number of times ill is given in Table 11, was ill twice during the school year 1924-1925, was not ill at all during 1925-1926, but was ill four different times in the year 1926-1927 and so on according to the table. The total number of times this person was ill is thirteen and the mean number of times for each of the six school years is 2.17 ($1\frac{3}{6} = 2.17$). It will be seen that the figures indicating the number of times ill for each year give no information as to the length of each illness.

TABLE 12

MEAN NUMBER OF TIMES ILL FOR SIX YEAR PERIOD FROM
SEPTEMBER 1924 TO JUNE 1930

Number of Teachers	Number of Times Ill	Number of Times Ill Per Teacher	Mean Times Ill Per Teacher Per Year
921	6874	7.46	1.24

The average number of times ill per year for female teachers in the white elementary schools of Baltimore is 1.24 (*see* Table 12). Carrothers,⁷ from a five year study of the absences of Cleveland teachers, gives an average of 1.78 times for women teachers.

From Table 13 (*see* Figure 3), it will be seen that the median for the number of times ill is from four to eight times for the six year period, or 1.17 times per teacher per year. This means that fifty per cent of the 674 teachers are ill 1.17 times or fewer per year.

3. The Average Duration of Illness

Besides the amount and frequency of illness of teachers in the white elementary schools, this study considers the duration of illness. The duration of illness, as defined in Chapter II, (page 7) measures the average length of the periods of illness of an individual. Hence, if a teacher is absent from school seven times due to illness during the six year period and has a total of twenty-three days of illness, her average duration of illness is 3.29 days, ($2\frac{3}{7} = 3.29$).

⁷ Carrothers, G. E., *op. cit.*, p. 27.

It is possible for two individuals who have different numbers of total days ill and different numbers of times ill to have the same average duration of illness, e. g., a person who is ill one day only during the six school years would have a duration of illness of one day, whereas, one who is ill twenty days at twenty different times during the same period of time would have a duration of illness of one day also. Duration

TABLE 13

TEACHERS CLASSIFIED BY NUMBER OF TIMES ILL FOR SIX YEAR PERIOD
FROM SEPTEMBER 1924 TO JUNE 1930

Number of Times Ill	Number of Teachers	Percent of Total Number of Teachers
-0.5 - 0.4 *	79	11.72
0.5 - 1.4	59	8.74
1.5 - 2.4	56	8.31
2.5 - 3.4	52	7.72
3.5 - 4.4	45	6.68
4.5 - 8.4 †	165	24.48
8.5 -12.4	99	14.69
12.5 -16.4	40	5.93
16.5 -24.4 ‡	48	6.53
24.5 -32.4	22	3.26
32.5 -40.4	7	1.04
40.5 and over §	2	0.35
Total	674	99.65

* The zero number of times ill includes those individuals who were ill less than one half day. The percent for this item should be multiplied by two in order to correspond with the following items.

† The step intervals for these items is four, so the percentages should be divided by four to correspond with the preceding items.

‡ The step interval for these items is eight, so the percentages should be divided by eight to correspond with the preceding items.

§ The limit of this step interval is 80.5, so the percentage should be divided by forty to correspond with the preceding items.

of illness measures the average length of illness which is characteristic of the individual. Thus, it is just as characteristic of the first individual as of the second to have an illness of one day when he is ill. A knowledge of the duration of illness of individual teachers should be of some value to administrators of schools in understanding teachers' habits of illness.

The average duration of illness of four days (*see* Table 14) suggests that most of the illnesses of teachers necessitate short absences from school and that many are less than four days long.

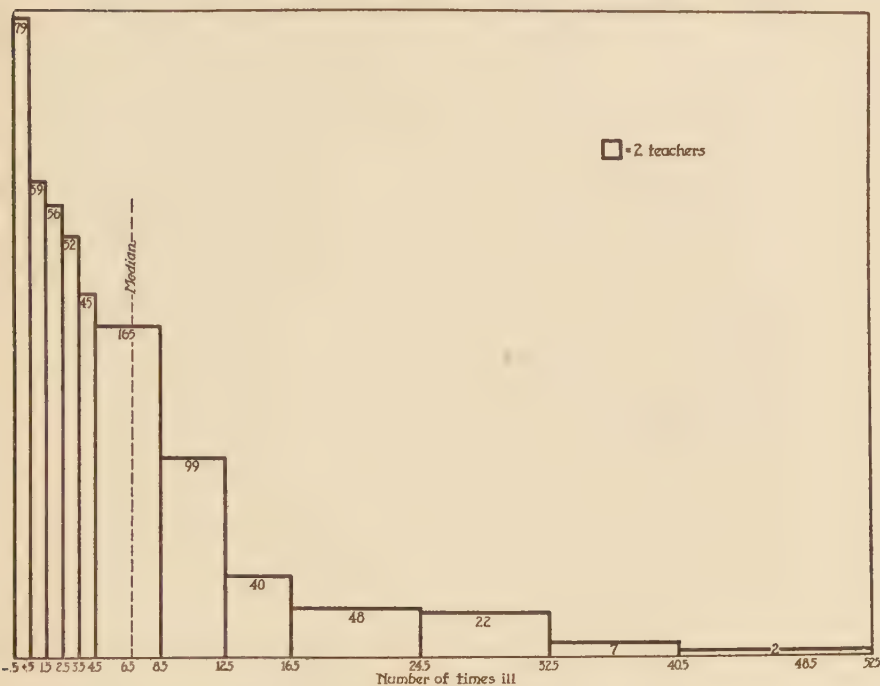


Figure 3. Teachers classified by number of times ill for six year period

TABLE 14

AVERAGE DURATION OF ILLNESS FOR SIX YEAR PERIOD FROM
SEPTEMBER 1924 TO JUNE 1930

Number of Teachers	Number of Times Ill	Number of Days Ill	Average Duration of Illness Per Teacher Per Year
921	6874	27,519	4.0

4. The Distribution of the Actual Duration of Illnesses

From the results of the study of the average duration of illness, which indicated that the Baltimore teachers are ill

for short periods of time, it seemed desirable to examine the actual length of the periods of illness for each teacher.

TABLE 15

PERCENT OF TEACHERS BY ACTUAL DURATION OF ILLNESS FOR THE SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Actual Length of Illnesses in Days	Number of Teachers Ill	Total Number of Illnesses	Percent * of Total Number of Teachers	Adjusted Percent †
-0.25 - 0.24	79	0	11.72	11.72
0.25 - 0.74	222	426	24.10	48.20
0.75 - 1.74	687	3124	74.58	74.58
1.75 - 5.74	684	2480	74.26	18.57
5.75 - 10.74	279	407	30.29	5.06
10.75 - 20.74	175	224	19.00	1.9
20.75 - 40.74	95	108	10.31	0.52
40.75 and over	83	99	9.01	0.23

* This per cent totals more than one hundred since one teacher may have more than one illness of the same length or several illnesses of different lengths.

† The step interval for the table is taken as one and the percentage is adjusted throughout the table on the basis of this interval.

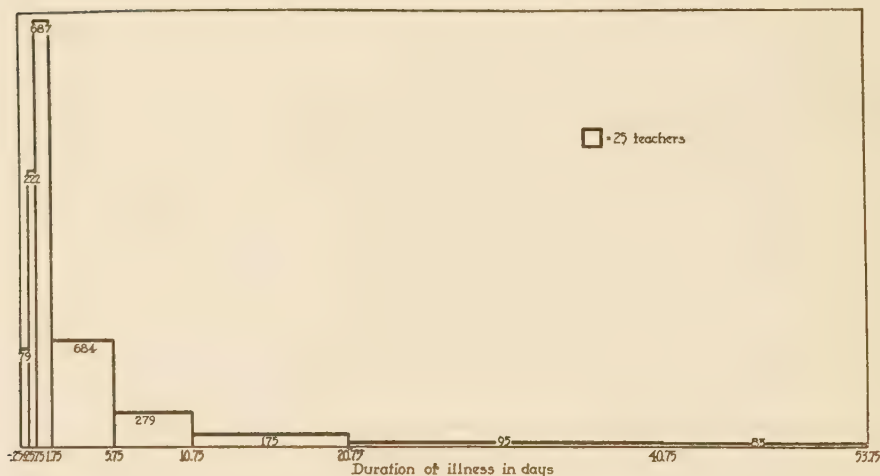


Figure 4. Distribution of teachers by actual duration of illness for six year period

Table 15 (*see* Figure 4), shows that over 24 per cent of the Baltimore teachers have half-day illnesses, 74.58 per cent of the teachers have illnesses of one day in length and 18.57 per cent have two to five-day illnesses. The number of teachers having two to five-day illnesses is less than that having one-day illnesses. At the same time it will be seen that the number having six to ten-day illnesses is considerably less than that having two to five-day illnesses and so on for the various periods of illnesses. Brundage⁸ makes the statement that "in a large group of people the number of one day disabilities is normally larger than the number of two day disabilities, two day disabilities are more numerous than three day disabilities, etc."

Since in a number of morbidity studies,⁹ respiratory diseases have been shown to be the chief cause of illness and since the common cold has a short duration, it is not surprising to find this large proportion of two to five day absences.

There seems, however, an additional explanation of the differences between the percentage of teachers absent two to five and six to ten days. The Board of School Commissioners¹⁰ of Baltimore City has ruled that a teacher who needs to be absent from school longer than five consecutive days because of illness must submit to the Board a physician's certificate stating that her illness necessitates her being away from school for the longer period of time. The trouble and, it may be, the expense of complying with this ruling, if a physician has not been in attendance, will likely cause some teachers to return to school before they have entirely re-

⁸ Brundage, D. K., "Disabling Sickness among Employees of a Rubber Manufacturing Establishment in 1918, 1919 and 1920," *Public Health Reports*, December 15, 1922, Reprint No. 804, p. 8.

⁹ Rogers, J. F., *op. cit.*, pp. 10-11.

Brundage, D. K., "Sickness Among Industrial Employees," *Public Health Reports*, Reprint No. 1347, pp. 7, 8; Reprint No. 969, p. 4; Reprint No. 1266, p. 2.

Sydenstricker, Edgar, "The Incidence of Illness in a General Population Group," *Public Health Reports*, Reprint No. 40, Part 1, 1925, pp. 286-287.

¹⁰ *Rules of the Board of School Commissioners*. Baltimore: Department of Education, 1927, p. 33.

Public School Directory of Baltimore, Maryland, 1923, p. 140.

covered. At the same time it may permit the more self-indulgent to extend a one or two day illness to five days. Incidentally this ruling requiring a physician's statement of the condition of the patient may have the desirable effect in some cases of forcing an individual, who would be content with self-doctoring, to consult a physician.

CHAPTER V

THE ANALYSIS OF THE RELATION OF CERTAIN FACTORS TO ILLNESS

1. The Relation of the Month of the Year to the Amount of Illness

In the preceding chapters it has been stated that the average amount of illness of teachers in the white elementary schools is less than that which has been found for workers in other fields. It is this fact that leads one to investigate the factors in the environment of teachers and certain factors common to the teaching situation in order to understand what their influence may be upon the illness of teachers. First of all, since the season of the year plays a conspicuous part in the fluctuations of some diseases, such as some of the respiratory diseases, it is desirable to determine what relation the month of the year has to the amount of illness of teachers and also to the number of teachers absent because of illness.

Because the number of school days in each month varies, it was necessary to make an adjustment in the average number of days ill by months, so that the figures of the ten months would be comparable (*see* Table 16, Figure 5). The amount of illness (*see* Table 16, Figure 5) increases continuously for the months of October, November and December until the peak of the amount is reached in January and February. From February until June there is a continual decrease though the amount of illness even in May and June is greater than that in September.

Sydenstricker's¹ curves for the incidence of illness in a general population group show for the year 1922 a gradual increase in the amount of illness for November and December, and the highest peaks of the curve in January and March. In February of this year there is a slight drop in the amount of illness. For the years 1923 and 1924, the curves are much

¹ Sydenstricker, Edgar, "The Incidence of Illness in a General Population Group," *Public Health Reports*, 1925, Reprint No. 40, p. 285.

TABLE 16

AVERAGE NUMBER OF DAYS ILL PER TEACHER BY MONTHS, FOR SIX
YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Month	Average Number of Days Ill Per Teacher	
	Not Adjusted *	Adjusted †
September	1.33	1.56
October	2.44	2.15
November	2.68	2.68
December	2.63	3.09
January	4.31	4.10
February	4.23	4.45
March	4.32	3.81
April	3.32	3.41
May	3.24	2.94
June	1.30	2.36

* The average number of days ill is calculated without taking into account the exposure to illness due to the variation in the number of school days in each month.

† The average number of days ill is calculated on the basis of twenty school days per month. See Appendix B.

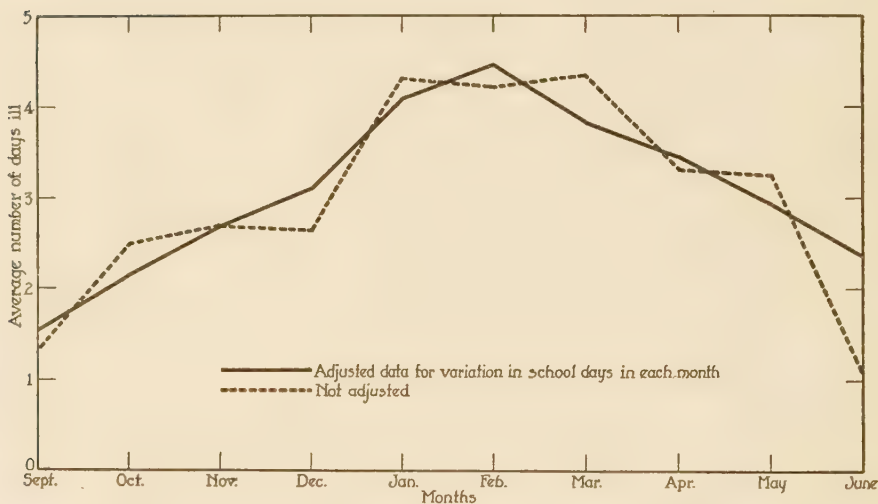


Figure 5. Average number of days ill per teacher by months per six year period

like that of 1922, except that in the two months, January and February, the peak in the amount of illness in this general population group is reached; in the spring months, there is about the same amount of illness as there is in November and December, a rate higher than that for September and October. The population studied by Sydenstricker differs from the group of teachers in this study in that it is composed of adults and children, both males and females, however, his curves correspond rather closely with the curves for the amount of illness of teachers by months (*see* Table 16, Figure 5).

Though mortality statistics give information about deaths and not about sickness, yet they appear to indicate the amount of illness and are frequently so considered. The mortality statistics² for Baltimore for the years 1925, 1926, and 1927, give the highest death rates for January, February, and March. The death rate for May is slightly higher than that for December.

The results of Sydenstricker's study given above and what we may assume concerning sickness from the mortality statistics seem to signify that the greater amount of illness among Baltimore teachers in March, April and May than in September and October may be in part or wholly due to seasonal influence rather than to the fatigue of the preceding months of teaching to which physical disability at this time is frequently attributed.

Frost³ writes that the season of high prevalence of the common cold is from September to March. The curves of the common cold show peaks in November and December but the highest are in the months of January and February with a downward trend to the lowest points in July and August. The upward trend in the curve of the amount of illness by months for teachers and the high points in January and February correspond somewhat with the curves for the common cold as given by Frost.

² *United States Mortality Statistics*, 1925, 1926, 1927.

³ Frost, W. H., and Gover, Mary, "A Study of the Incidence and Time Distribution of Common Colds," *Public Health Reports*, XLVII, p. 1840.

2. The Relation of the Month to the Number of Teachers Ill

Though the curve for the average number of days ill by months (*see* Table 16) shows an upward trend in the amount of illness until the peak of the curve is reached in February and a downward trend for the spring months, it does not indicate whether the teachers who are ill have long periods of illness during the winter months or whether a greater number of teachers is ill.

The curve for the number of teachers ill each month (*see* Table 17, Figure 6) follows closely that of the amount of illness by months (*see* Table 16, Figure 5). It will be seen that the increases and decreases in the amount of illness by months is not confined to a few individuals but is more widespread since the number of individuals concerned varies directly with the amount of illness.

3. The Relation of Age to the Amount of Illness

In many of the public health epidemiological studies, the relation of age to the incidence of certain diseases shows considerable variation. There are the "children's diseases" which seldom affect adults, there are organic difficulties, which are more common among the older groups and there are other diseases, such as tuberculosis, which is found among any age group. This study of sickness among teachers cannot unfortunately present any data on the kinds of illnesses among teachers of different ages since the type of illness is not recorded on the reports, but it can, however, analyze the amount, the frequency, the duration and the actual length of the periods of illness among teachers of different ages.

TABLE 17

RATE OF TEACHERS ILL BY MONTHS FOR SIX YEAR PERIOD FROM
SEPTEMBER 1924 TO JUNE 1930

* Rate per 100	Months										
Teachers	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	
Rate	24	38	47	45	56	58	57	48	46	22	
† Adjusted Rate	29	33‡	47	52‡	53	61	50	49	42	40‡	

* The numbers, indicating the rate of teachers ill by months, signify distinct individuals. A teacher who may have been ill once, twice, or more frequently during a month, is counted as one teacher.

† Adjusted rate per month has been calculated on the basis of twenty school days per month.

‡ The difference of one here is due to using the decimals in the calculation rather than the whole numbers.

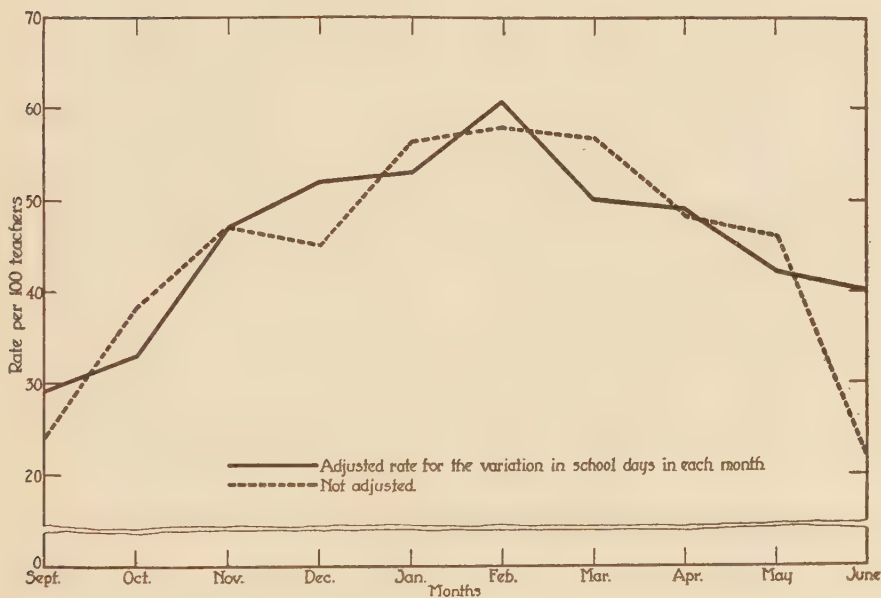


Figure 6. Rate of teachers ill by months for six year period

Table 18 gives the distribution of the Baltimore teachers by their amount of illness according to age. In order to discover in general if there is some relation between the amount of illness of teachers and their ages the means and standard deviations of age on illness were found (*see* Table 18). The variability of the means in each column is great though

TABLE 18

DISTRIBUTION OF 674 TEACHERS BY AGE AND TOTAL DAYS OF ILLNESS
FROM SEPTEMBER 1924 TO JUNE 1930

Total	Age										
Days Ill *	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	T ¹
0 - .49	1	15	6	7	7	7	10	10	13	3	79
.5 - .99		2				1					3
1 - 5	8	8	19	7	9	6	17	11	7		92
6 - 10	8	16	14	8	6	9	18	10	3		92
11 - 15	14	12	7	1	1	11	10	5	3	1	65
16 - 20	4	7	12	10	4	4	4	6	3	2	56
21 - 25	5	10	5	3	1	3	7	5	4		43
26 - 30	6	9	5		2	2	6	2	1	2	35
31 - 35	4	3	4	5	1	2	5	5	1	1	31
36 - 40	5	3	2	5	1	1	2	3	2		24
41 - 45	3	4	3		2	1	2	2	1		18
46 - 50	4	1	2	4		2	2	3	1		19
51 - 55	1		4			1	2	1			9
56 - 60	4		3		1		2	1	3		14
61 - 65		1			1	1	4	2	2		11
66 - 70	2	1		1		1	2	1	1		9
71 - 75	1					1	3	1			6
76 - 80			2			3	1				6
81 -	5	8	6	5	8	9	7	11	2	1	62
Total	75	100	94	56	44	65	104	79	47	10	674
Means	33.36	26.46	27.32	30.25	37.7	37.81	28.68	37.02	23.92	28.2	31.10
Stan.Dev.	33.92	36.6	34.65	38.10	51.0	46.0	36.50	45.55	22.75	39.4	39.50

$$\text{Eta} = .202 \pm .025$$

* The irregular intervals in total days ill were so treated in the calculation of the correlation ratio.

there is little variability in the means from column to column. Therefore, the coefficient of correlation, which measures the degree of correspondence only when the traits have a linear relationship, is inapplicable ⁴ here. Holzinger states, "With

⁴ Holzinger, K. J., *Statistical Methods for Students in Education*. New York: Ginn and Company, p. 177.

any scatter in the data, two lines will be obtained for a correlation table, one from the means of the columns and one from the means of the rows. The graphical test for approximate linearity and the justification of the use of the product-moment method is furnished by plotting the means of the arrays and noting the extent to which they fall on these two lines." ⁵

In order to determine the degree of relationship for non-linear tables, a formula devised by Professor Pearson and known as the correlation ratio may be used. The correlation ratio shows whether the scatter of the points around a curve is great or not. Thus the correlation ratio gives the amount or extent of the relationship though it does not measure the nature of the correlation, i. e., whether it is a positive, a negative or a varying relationship. When the correla-

tion ratio $\left(\text{Eta} = \sqrt{1 - \frac{\text{Sigma}^2 \text{ ay}}{\text{Sigma}^2 \text{ y}}} \text{ or } \sqrt{1 - \frac{\text{Sigma}^2 \text{ ax}}{\text{Sigma}^2 \text{ x}}} \right)$

approaches the whole number one, the data approaches a single-valued function, but when Eta approaches zero, the relationship between the variables is correspondingly slight. For the columns in the distribution of teachers by total days' illness

and age $\frac{\text{Sigma}^2 \text{ ay}}{\text{N}} = \frac{1008693.6}{674}$ and $\text{Sigma}^2 \text{ y} = 1560.25$.

$\text{Eta} = \sqrt{1 - \frac{1496.57}{1560.25}} = .202$. This value of Eta, $.202 \pm$

$.025$, shows that the relationship between the total number of days ill and age is slight. Nevertheless the value of the probable error of Eta, $\pm .025$, indicates that the relationship present though slight is significant.

The mean number of days ill for Baltimore teachers is 4.99 (see Table 9). It will be noticed that the average number of days ill for each of the age groups under forty

⁵ *Ibid.*, p. 154.

TABLE 19

AVERAGE NUMBER OF DAYS ILL BY AGE FROM SEPTEMBER 1924
TO JUNE 1930

Age	Number of Teachers	Number of Days Ill Per Six Year Period	Average Number of Days Ill Per Teacher Per Year
20-24	100	2879	4.13
25-29	135	3597	4.32
30-34	132	3167	4.0
35-39	80	2300	4.78
40-44	70	2270	5.4
45-49	88	3342.5	6.33
50-54	134	4117.5	5.12
55-59	106	3477	5.47
60-64	63	1996	5.28
65-69	13	373	4.78
	921	27519	4.99

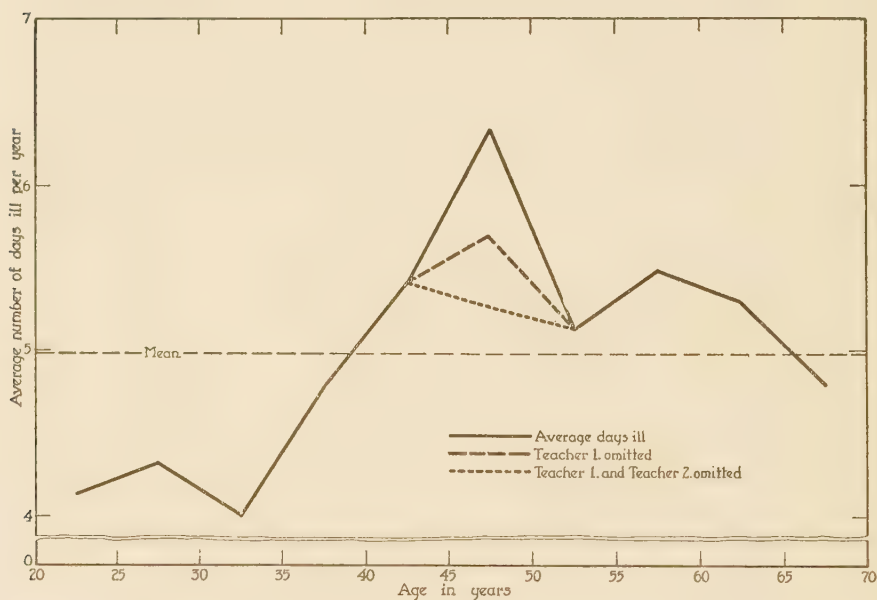


Figure 7. Average number of days ill by age per school year

lies below this mean (*see* Figure 7) and the average number of days ill for each age group over forty lies above the mean. The number of individuals in the 65-69 age group is too small to consider the figures reliable. To determine further the significance of the amount of illness and age the differences in the amount of illness of the two groups of teachers, those twenty to forty years of age and those forty to sixty-five years of age, were tested for errors due to sampling. The actual difference in the number of days ill for the two age groups is 6.18 per teacher per six years, or 1.03 per teacher per year. The

$$\frac{\text{Difference of the Proportion}}{\text{Difference of the Sigma of the Proportion}}, \frac{.00539}{.00031196}, \text{ equals}$$

17.28.⁶ This result indicates that the difference that exists between the amount of illness of the younger and older groups of teachers would never be due to chance. From the results above, age has an influence upon the amount of illness of teachers and the amount of illness, or the average number of days of illness, increases with age. Older teachers have then a greater number of days of illness than younger teachers.

Curves of the severity rate of illness for women workers set up by Brundage⁷ show the smallest number of days ill at twenty years of age, and an increase in the amount of illness to around fifty years where the curve flattens out somewhat. This curve is similar to the one obtained in this study (*see* Figure 7) for the average number of days ill by age groups.

Since the age group forty-five to fifty years (*see* Table 19) shows the highest average number of days ill, a study of the individuals in this group was made and two individuals were found to be responsible for the decidedly higher figure for this group. One of these individuals, Teacher One in Figure 7, had 453 absences due to illness for the six year period, the greatest number in the whole population

⁶ See Appendix C for table set up for this problem.

⁷ Brundage, D. K., "A Ten Year Record of Absences from Work on Account of Sickness and Accidents," *Public Health Reports*, XLII, Part I (February 25, 1927), p. 554.

and the other, Teacher Two, had 228 days of illness. With Teacher One omitted the average for the forty-five to fifty year age group is 5.68 days ill and with both Teacher One and Two omitted, the average is 5.25. With these two individuals omitted the data maintain a more even trend in the higher age groups. The means of the distribution of 674 teachers by amount of illness and age (*see* Table 18), when reduced to a yearly average are greater for the different age groups than the means for the 921 teachers given in Table 19 and Figure 7. It is true that the number of teachers studied is less for Table 18 than for Table 19. In addition to this difference in the two tables, principals⁸ of the elementary schools, who have a lower average number of days' illness than classroom teachers, are not included in the data of Table 18 but are included in the total population of Table 19.

4. The Relation of Age to the Frequency of Illness

It has been shown in the preceding section that the older teachers have a greater number of days of illness than younger teachers. The question then arises whether the frequency of illness varies with age, that is, whether the older teachers make up their greater number of days of illness with a greater number of times ill, or with longer illnesses when they are ill, and whether the younger teachers are less frequently ill and so have fewer days of illness, or whether some other condition prevails.

The standard deviations for the means in the distribution of teachers by the total number of times ill and age (*see* Table 20 and Figure 8) indicate a wide range for the means in each column. Though there is considerable variability in the means, the trend of the standard deviations is fairly homoscedastic.

The correlation ratio⁹ for this distribution of teachers by number of times ill and age equals $\sqrt{1 - \frac{55.3660}{59.0439}}$ or .249 $\pm$.024. The nearer the correlation ratio, Eta, approaches

⁸ Page 69.

⁹ Pages 9, 39.

TABLE 20

DISTRIBUTION OF TEACHERS ACCORDING TO NUMBER OF TIMES ILL
AND AGE FOR SIX YEAR PERIOD, SEPTEMBER 1924 TO JUNE 1930

Total no. of Times Ill *	Age											T'l
0	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69		
	1	15	6	7	7	7	10	10	13	3		79
1 - 4	11	29	29	14	16	23	43	29	17	1		212
5 - 8	20	22	32	14	8	9	29	21	6	4		165
9 - 12	17	14	15	13	5	12	9	8	4	2		99
13 - 16	9	7	2	3	1	5	5	3	5			40
17 - 24	8	9	5	3	5	6	6	5	1			48
25 - 32	7	3	2	2	2	3	2	1				22
33 - 40	1	1	2					2	1			7
41 -	1		1									2
Total	75	100	94	56	44	65	104	79	47	10		674
Means	12.67	8.18	8.41	8.08	7.74	8.55	3.83	7.34	5.84	5.45		8.19
Stan. Dev.	9.13	7.50	8.11	6.56	7.72	7.16	5.97	7.51	6.72	3.88		7.68
Eta = .249 ± .024												

* The irregular intervals in total number of times ill were so treated in the calculation of the correlation ratio.

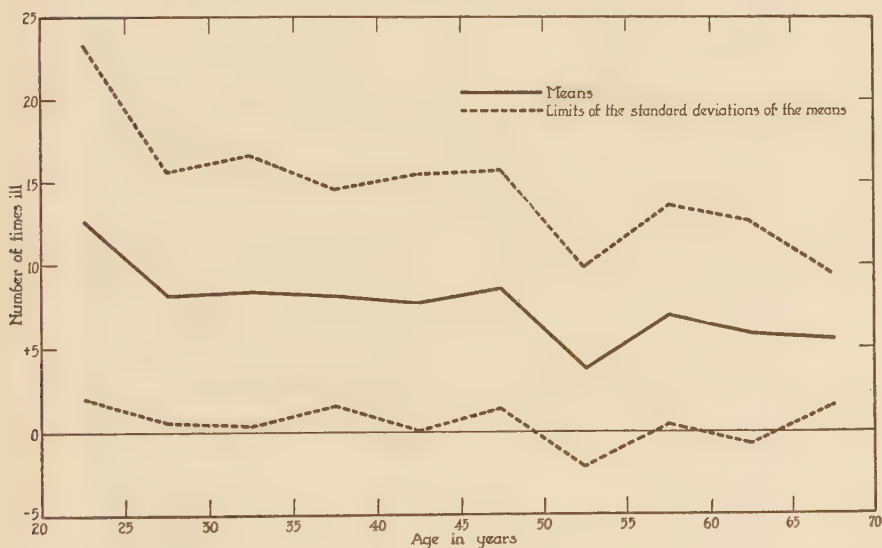


Figure 8. Means and limits of the standard deviations of number of times ill by age for six year period

the whole number one, the greater the amount of relationship, therefore the relationship between the number of times ill and age is slight. Since the value of Eta, .249, however, is greater than three times its probable error, $\pm .024$, this slight relationship between the number of times ill and age is significant for age. The above value for Eta and its probable error and the decrease in the values of the means of the columns, Table 20, lead to the conclusion that as the Baltimore teachers advance in age they are ill less frequently.

TABLE 21
AVERAGE NUMBER OF TIMES ILL BY AGE FOR SIX YEAR PERIOD
FROM SEPTEMBER 1924 TO JUNE 1930

Age	Number of Teachers	Number of Times Ill Six Year Period	Average Number of Times Ill Per Teacher Per Year
20-24	100	1128	1.88
25-29	135	1062	1.31
30-34	132	951	1.20
35-39	80	645	1.34
40-44	70	471	1.12
45-49	88	654	1.24
50-54	134	828	1.03
55-59	109	704	1.11
60-64	63	374	0.16
65-69	13	57	0.73

It has been found that the average number of times ill per teacher per year for the group of Baltimore teachers is 1.24.¹⁰ It will be seen from Table 21 that the number of times ill for those teachers under forty years of age tends to lie above or around the mean for the total population, whereas, for those teachers over forty years of age the number of times ill tends to lie below the mean. The actual difference in the number of times ill for the two groups is 1.08 per teacher per six years, or .18 per teacher per year. The statistical criterion of the significance of the difference in the figures for these two age groups equals

$\frac{.0018929}{.000313847}$, or 6.03.¹¹ From this value we may say that the

difference in the number of times ill for the two age groups

¹⁰ Page 27.

¹¹ See Appendix D for more detailed calculations.

is greater than zero and not due to chance. From the correlation ratio for Table ²⁰ and the test applied to the average number of times ill for the younger and older age groups, it is seen that the frequency of illness decreases with age.

Brundage ¹² found in his study of female industrial workers that the frequency of illness appeared to decrease with age. He set up a curve which has the same general trend as that found in Table 21.

The means of the distribution of 674 teachers by number of times ill (*see* Table 20) when reduced to a yearly average are greater for the different age groups than the means for the 921 teachers given in Table 21. It is true that the number of teachers concerned is less for Table 20 than for Table 21. In addition to this difference in the number of cases for the two tables, principals ¹³ of the elementary schools among the total number of teachers in Table 21 would tend to lower the average since the principals are ill less frequently than classroom teachers.

5. The Relation of Age to the Average Duration of Illness

It has been found in the study of the preceding tables that the amount of illness of teachers increases with age but that the frequency of illness decreases with age. It will be recalled that the duration of illness has to do with the amount and with the frequency of illness.¹⁴

For the distribution of teachers by average duration of illness and age (Table 22, Figure 9) the correlation ratio is

$\sqrt{1 - \frac{29.7681}{30.6916}}$, or $.173 \pm .025$. Since the average duration

of illness is a derivative of the total number of days ill and the number of times ill, one would not expect a higher correlation of the average duration of illness and age than was found for the amount and the frequency of illness. As it

¹² Brundage, D. K., "A Ten Year Record of Absences from Work on Account of Sickness and Accidents," *Public Health Reports*, XLII, Part I (February 25, 1927), pp. 544, 546.

¹³ Page 69.

¹⁴ Chap. IV, p. 27.

happens the value of Eta for the average duration of illness is less than that for the amount (p. 39) and for the frequency of illness (p. 42). The probable error of Eta, that equals .173, is $\pm .025$, which indicates that though the relationship between average duration of illness and age is slight it is

TABLE 22

DISTRIBUTION OF 595 TEACHERS* BY AVERAGE DURATION OF ILLNESS AND AGE FOR SIX YEAR PERIOD, SEPTEMBER 1924 TO JUNE 1930

Average Duration of Illness †	Age										T'l
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	
0.5- 0.9		3	1			1		1			6
1.0- 1.9	28	27	33	12	10	10	22	17	12	1	172
2.0- 3.9	35	32	30	21	12	21	38	21	11	3	224
4.0- 5.9	7	10	13	6	7	9	12	8	5	2	79
6.0- 9.9	3	6	6	6	4	12	11	10	2		60
10.0-13.9	1	4	3	3		4	2	2			19
14.0-17.9		1		1	2	1	2	3	1		11
18.0-21.9		1			1		2	1			5
22.0-25.9			1				1	1	1		4
26.0-29.9			1				1	3	1		6
30 plus		1			1		3	2	1	1	9
	74	85	88	49	37	58	94	69	34	7	595
Means	2.95	4.17	3.88	4.31	5.51	4.89	5.80	6.92	5.71	7.79	4.85
Stan. Dev.	1.82	4.72	4.16	3.28	6.38	3.34	7.04	8.04	7.76	10.76	5.68

$$\text{Eta} = \sqrt{1 - \frac{29.7681}{30.6916}} = .173 \pm .025$$

* The 79 teachers who had no illnesses are omitted from this table.

† The irregular intervals in duration of illness were so treated in the calculation of the correlation ratio.

significant and that illnesses of longer duration occur with an increase in age.

From Table 23 and Figure 9, it will be seen that the figure for the mean duration of illness, 4.0 days, divides the curve into two parts, the mean durations of illness for teachers in the age groups under forty years lie below this mean for the total population and the mean durations of illness for teachers in the age groups over forty lie above this mean. A similar division into two groups at around forty years of age occurred in the consideration of the average amount of illness by age (*see* Table 19) and the average number of times ill by age (*see* Table 21).

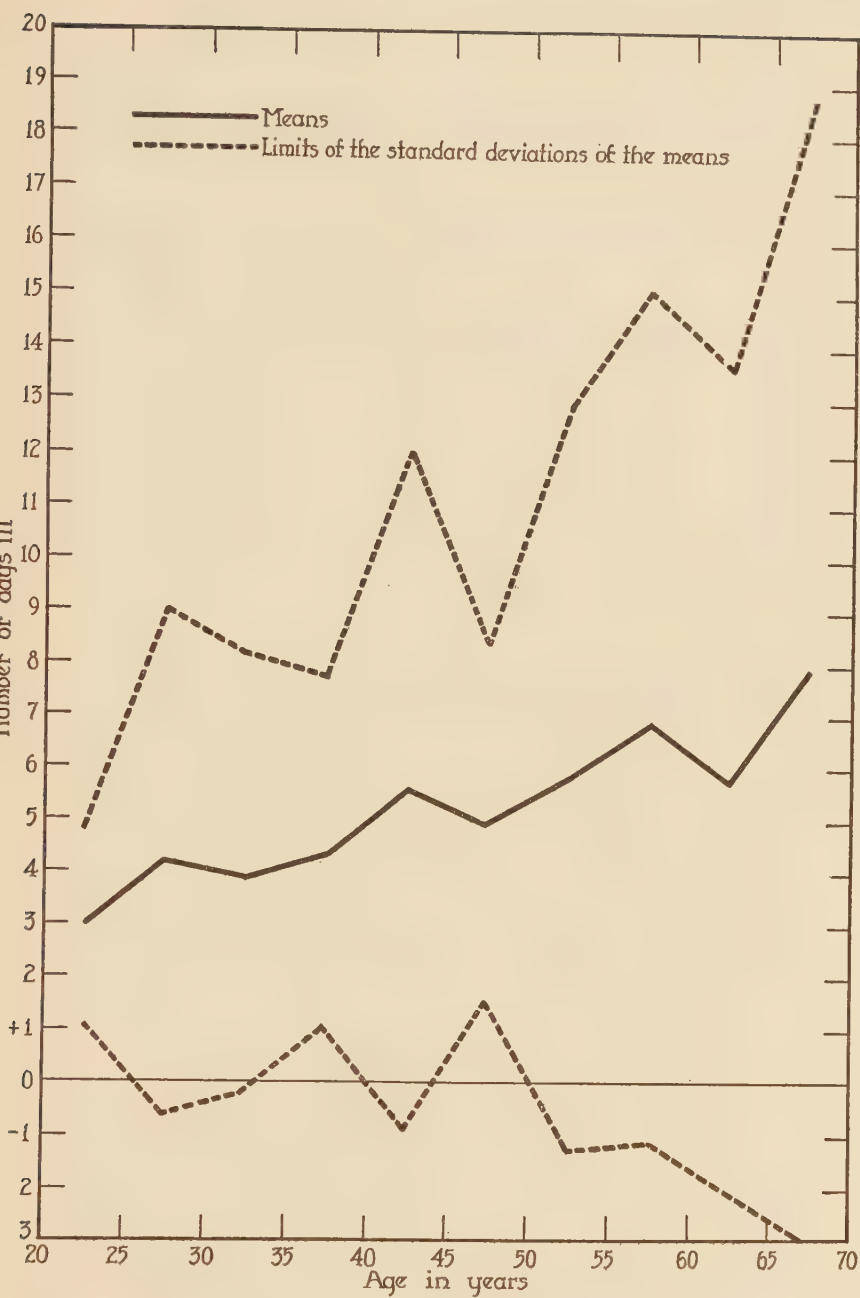


Figure 9. Means and limits of the standard deviations of the average duration of illness by age for six year period

From the correlation ratio for the distribution of teachers by average duration of illness and age (*see* Table 22), and

TABLE 23
AVERAGE DURATION OF ILLNESS BY AGE FOR SIX YEAR PERIOD FROM
SEPTEMBER 1924 TO JUNE 1930

Age	Number of Teachers	Number of Days Ill	Number of Times Ill	Average Duration of Illness Per Teacher Per Year
20-24	100	2879	1128	2.55
25-29	135	3597	1062	3.39
30-34	132	3167	951	3.33
35-39	80	2800	645	3.57
40-44	70	2270	471	4.82
45-49	88	3342.5	654	5.11
50-54	134	4117.5	828	4.97
55-59	106	3477	704	4.94
60-64	63	1996	374	5.34
65-69	13	373	57	6.54
Total	921	27519	6874	4.00

the average duration of illness by age (*see* Table 23) older teachers have longer periods of illness than younger teachers.

The means of the columns of Table 22, and Table 23, are not identical for corresponding age groups. The number of cases studied are not the same for the two tables since Table 22 gives the average duration of illness for 595 teachers. Table 23 which shows the average duration of illness by age for 921 teachers, the total population, includes the teachers who have no illness and the principals¹⁵ of the schools whose duration of illness is less than that for the classroom teachers.

6. The Relation of Age to the Actual Length of the Periods of Illness

The results of the study of the amount and the frequency of illness by age (p. 36 to 42) suggest that the younger teachers, or those under forty years of age, have frequent short illnesses while older teachers or those over forty are ill less often but for longer periods of time. Tables 24 to 37 which follow give the actual lengths of the periods of illness of the different age groups.

¹⁵ Page 69.

TABLE 24
NUMBER OF HALF-DAY ILLNESSES PER TEACHER BY AGE FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Age	Total Number of Teachers	Number of Half-Day Illnesses											Total Number $\frac{1}{2}$ Day Illnesses	Number Teachers Having $\frac{1}{2}$ Day Illnesses	Mean Number $\frac{1}{2}$ Day Illnesses Per Teacher
		0	1	2	3	4	5	6	7	8	9	10	11		
20-24	100	61	18	11	3	1	4				2			39	.91
25-29	135	95	22	6	2	6	3	1						40	.63
30-34	132	100	24	6	1		1							32	.33
35-39	80	59	11	8	1					1				21	.48
40-44	70	54	10	1	1	1	2	1						16	.50
45-49	88	71	12	4						1				17	.32
50-54	134	112	15	7										22	.22
55-59	106	83	14	3	1	2	1	1					1	23	.5
60-64	63	52	6	3		2								11	.35
65-69	13	12	1											1	.08
Totals	921	669	133	49	9	10	13	3		2	2		1	222	.46

Table 24 shows:

1. That the age group 20-24 has the highest mean number of half-day illnesses, 0.91. With the exception of the 65-69 age group in which the number of cases, thirteen, is too small to consider the mean reliable, the age group, 25-29, has the next highest mean average, 0.63.
2. That the teachers from twenty to thirty-five years of age have more than half of the total number of one-half-day illnesses, that is, the teachers less than thirty-five years old have fifty-two per cent of the one-half-day illnesses.
3. That eleven half-day illnesses for a teacher in age period, 55-59, nine half-day illnesses for two teachers in age period, 20-24 and eight half-day illnesses for two teachers in age periods, 35-39 and 45-49 respectively, in comparison with the smaller numbers for most of the other teachers, suggest that this type of illness is characteristic of these individuals.

TABLE 25

MEAN NUMBER OF HALF-DAY ILLNESSES PER TEACHER BY AGE GROUP
FOR SIX YEAR PERIOD, SEPTEMBER 1924 TO JUNE 1930

Age	Total Number of Teachers	Total Number of Teachers Having ½ Day Illnesses	Total Number ½ Day Illnesses	Mean Number ½ Day Illnesses Per Teacher Per Six Year Period
20-39	447	132	258	.58
40-69	474	90	168	.35

Table 25 shows:

1. That more teachers under forty years of age have one-half-day illnesses than those over forty, since the numbers of teachers are 132 and ninety respectively.
2. That the highest mean number of illnesses per teacher 0.58, occurs among those under forty years old.

TABLE 26

NUMBER OF ONE-DAY ILLNESSES PER TEACHER BY AGE FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Number of One-Day Illnesses	<i>Age</i>											T'l
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69		
0	12	35	24	19	25	22	37	32	23	5		234
1	10	19	14	13	6	17	25	21	16	4		145
2	6	21	28	7	11	12	22	20	7	1		135
3	8	13	16	7	6	7	16	10	5	1		89
4	11	8	16	6	4	12	9	5	2	2		75
5	9	4	10	4	4	1	5	3	2			42
6	14	8	5	9	1	5	7	2	2			53
7	4	5	7	4	1	6	6	1	3			37
8	5	6	3	1	2	1	1	2	1			22
9	2	2			3	1		1	1			10
10	2		3	2	1	1		1				10
11	6	2		1	3	1	1	2				16
12	1	3	1	2	1	1		2				11
13	2	1		2	1		1	1				8
14	2	1	4		1	1	1	2				12
15	1	4					1					6
16				1			1	1				3
17	1	1		1			1					4
18												
19	1	1		1								3
20			1									1
21		1										1
24	1											1
26	2											2
29									1			1

Total Number of One-Day Illnesses—

584 503 453 315 220 251 356 283 142 17 3124

Number of Teachers Having One-Day Illnesses—

88 100 108 61 45 66 97 74 40 8 687

Mean Number One-Day Illnesses Per Teacher for Six Year Period—

5.84 3.73 3.43 3.94 3.14 2.85 2.66 2.67 2.25 1.31 3.39

Total Number of Teachers—

100 135 132 80 70 88 134 106 63 13 921

Table 26 shows:

1. That the teachers in the 20-24 age period have the greatest number of one-day illnesses, the number being 584. The mean number of one-day illnesses for these teachers is 5.84 as compared with 3.94, the next highest mean, for those in the 35-39 age period.

2. That, with the exception of the teachers thirty-five to forty years of age, there is a continuous decrease in the mean number of one-day illnesses per teacher as age increases.
3. That teachers sixty to seventy years of age have the smallest number of one-day illnesses, however, the number of teachers in the age period 65-69, eight, is too small to be considered reliable.
4. That certain teachers having from twenty-one to twenty-nine one-day illnesses in contrast with the smaller numbers of others suggests that one-day illnesses are characteristic of these individuals.

TABLE 27

NUMBER OF ONE-DAY ILLNESSES PER TEACHER BY AGE GROUPS FOR SIX YEAR PERIOD, SEPTEMBER 1924 TO JUNE 1930

Age Groups	Total Number of Teachers	Total Number of Teachers Having One-Day Illnesses	Total Number of One-Day Illnesses	Mean Number of One-Day Illnesses Per Teacher
20-39	447	357	1855	4.15
40-69	474	330	1269	2.68

Table 27 shows:

1. That a greater number of teachers under forty years of age have one-day illnesses than over forty.
2. That the greatest number of one-day illnesses occur among teachers from twenty to thirty-nine years of age; the mean number of one-day illnesses for the younger age group is 4.15 and for the older age group, 2.68.

TABLE 28

NUMBER OF TWO TO FIVE-DAY ILLNESSES PER TEACHER BY AGE FOR
SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Number of 2-5-Day Illnesses	<i>Age</i>										T'l
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	
0	9	35	32	19	19	21	41	33	23	5	237
1	22	28	25	12	19	22	34	25	12	1	200
2	18	21	30	14	15	14	16	10	6	1	145
3	11	15	13	11	5	9	11	6	1		91
4	10	10	10	7	3	2	9	7	3	3	64
5	4	7	8	5		2	9	5	2	1	43
6	7	5	3	4	2	2	5	5	5	1	39
7	4	7	3	5	2	2		2	4		29
8	3	1	2		1	5	4		1		17
9	3	1	1		1	2	1	3			12
10	2	1		1	1	2	2	4			13
11	2	2		1	2						7
12	2					3	2				7
13	1		2				1		1		5
14	2		1	1		1	1				6
15						1		1			2
17		1									1
23			1								1
26		1									1
29			1								1
Total Number of 2-5-Day Illnesses—											
379 361 360 220 151 264 316 257 143 29 2480											
Total Number of Teachers—											
100 135 132 80 70 88 134 106 63 13 921											
Number of Teachers Having 2-5-Day Illnesses—											
91 100 100 61 51 67 93 73 40 8 684											
Mean Number 2-5-Day Illnesses Per Teacher—											
3.79 2.67 2.72 2.75 2.15 3.0 2.27 2.42 2.27 2.23 2.67											

Table 28 shows:

1. That the greatest number of teachers having two to five-day illnesses is found in the age groups 20-24, 25-29, 30-34 and 50-54. The highest point in the curve falls in the 20-24 year age group.
2. That the teachers from twenty to twenty-four years of age have the highest mean number of two to five-day illnesses, 3.79 per teacher.

TABLE 29

MEAN NUMBER OF TWO TO FIVE-DAY ILLNESSES PER TEACHER BY AGE GROUPS FOR SIX YEAR PERIOD

Age Groups	Total Number of Teachers	Number of Teachers Having 2-5-Day Illnesses	Total Number of 2-5-Day Illnesses	Mean Number of 2-5-Day Illnesses Per Teacher
20-39	447	352	1320	2.95
40-69	474	332	1160	2.45

Table 29 shows:

1. That more teachers under forty years old have two to five-day illnesses than over forty, the numbers being 352 and 332.
2. That the younger age group, 20-39, has the larger mean number of two to five-day illnesses per teacher for the six year period. The difference in the mean for the two age groups 20-39 and 40-69 however is not so great as it was for one-day illnesses (*see* Table 27).

TABLE 30

NUMBER OF SIX TO TEN-DAY ILLNESSES PER TEACHER BY AGE FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Age	Total Number of Teachers	Number of 6-10-Day Illnesses							Number of 6-10-Day Illnesses	Mean Number of 6-10-Day Illnesses Per Teacher
		0	1	2	3	4	5	6		
20-24	100	70	23	6			1		40	.4
25-29	135	94	30	8	2			1	58	.43
30-34	132	99	24	8	1				43	.32
35-39	80	51	23	5			1		38	.48
40-44	70	51	14	2	2			1	30	.43
45-49	88	56	19	6	5	2			54	.61
50-54	134	97	22	11	3	1			57	.38
55-59	106	70	26	6	3	1			51	.49
60-64	63	46	12	2	1	1	1		28	.44
65-69	13	8	2	3					8	.62
Total	921	642	195	57	17	5	3	2	407	.44

Table 30 shows:

1. That the teachers in age groups, 45-49, and 65-69, have the highest mean number of six to ten-day illnesses.

The number of individuals in the latter age group is too small to consider the mean for the group reliable.

TABLE 31

NUMBER OF SIX TO TEN-DAY ILLNESSES PER TEACHER BY AGE GROUP
FOR SIX YEAR PERIOD

Age	Total Number of Teachers	Number of Teachers Having 6-10-Day Illnesses	Total Number of 6-10-Day Illnesses	Mean Number of Days Illness Per Teacher
20-39	447	133	179	4.00
40-69	474	146	228	4.81

Table 31 shows:

1. That the greater number of teachers 146, having six to ten-day illnesses is found in the older age group, 40-69.
2. That the mean number of six to ten-day illnesses for teachers in the older age group, 40-69, 4.81, is slightly higher than that, 4.00, for the younger group.

TABLE 32

NUMBER OF ELEVEN TO TWENTY-DAY ILLNESSES BY AGE FOR SIX
YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Age	Total Number of Teachers	Number of Teachers Having 11-20-Day Illnesses					Mean Number of 11-20-Day Illnesses Per Teacher
		0	1	2	3	4	
20-24	100	84	16				.16
25-29	135	107	22	6			.25
30-34	132	110	18	4			.3
35-39	80	66	11	3			.21
40-44	70	60	6	3		1	.23
45-49	88	70	11	6	1		.28
50-54	134	103	25	5	1		.21
55-59	106	83	17	4	1	1	.30
60-64	63	51	7	4	1		.29
65-69	13	12	1				.08
Total	921	746	134	35	4	2	.24

Table 32 shows:

1. That, with the exception of the age group 65-69 where the mean is .08, the teachers in age group 20-24, have the lowest mean number of eleven to twenty-day illnesses, .16. It is interesting to note that the sixteen

teachers in the 20-24 age group, who had eleven to twenty-day illnesses, had one such illness only. This is not true of the other groups. The age group, 65-69, is not considered since the number of cases is small.

TABLE 33

NUMBER OF ELEVEN TO TWENTY-DAY ILLNESSES PER TEACHER BY AGE GROUPS FOR SIX YEAR PERIOD

Age	Total Number of Teachers	Teachers Having 11-20-Day Illnesses	Total Number of 11-20-Day Illnesses	Mean Number of 11-20-Day Illnesses Per Teacher
20-39	447	80	93	.21
40-69	474	95	131	.28

Table 33 shows:

1. That the number of teachers having eleven to twenty-day illnesses, ninety-five, in the age group, 40-69, is slightly greater than the number of teachers, eighty, in the age group 20-39.
2. That the teachers in the older age group, 40-69, have the greater mean number, .28, of eleven to twenty-day illnesses.

TABLE 34

NUMBER OF TWENTY-ONE TO FORTY-DAY ILLNESSES PER TEACHER BY AGE FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Age	Total Number of Teachers	Number of 21-40-Day Illnesses				Number of 21-40-Day Illnesses	Number of Teachers Having 21-40-Day Illnesses	Mean Number of 21-40-Day Illnesses Per Teacher
		0	1	2	3			
20-24	100	90	10			10	10	.10
25-29	135	123	12			12	12	.09
30-34	132	120	10	2		14	12	.11
35-39	80	73	6		1	9	7	.11
40-44	70	61	9			9	9	.13
45-49	88	78	9	1		11	10	.13
50-54	134	123	8	3		14	11	.10
55-59	106	93	11	2		15	13	.14
60-64	63	52	9	1	1	14	11	.22
65-69	13	13				0	0	.00
Total	921	826	84	9	2	108	95	.12

Table 34 shows:

1. That teachers in age groups 40-44, 45-49, 55-59 and

60-64, have the highest mean numbers of twenty-one to forty-day illnesses.

2. That the recurrence of illnesses lasting from twenty-one to forty days appears more common after forty-five years of age, since there are eight individuals over forty-five having more than one illness of from twenty-one to forty days as opposed to three individuals in the younger groups.

TABLE 35

NUMBER OF TWENTY-ONE TO FORTY-DAY ILLNESSES PER TEACHER BY AGE GROUPS FOR SIX YEAR PERIOD

Age	Total Number of Teachers	Teachers Having 21-40-Day Illnesses	Number of 21-40-Day Illnesses	Mean Number of 21-40-Day Illnesses Per Teacher
20-39	447	51	45	.10
40-69	474	44	53	.11

Table 35 shows:

1. That the number of teachers having twenty-one to forty-day illnesses is greater for the younger age group, 20-39.
2. That the mean number of twenty-one to forty-day illnesses for the older group of teachers, 40-69, is slightly greater than that for the younger teachers.

TABLE 36

NUMBER OF FORTY-ONE-DAY ILLNESSES AND OVER PER TEACHER BY AGE FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Age	Total Number of Teachers	Number of 41-Day Illnesses and Over					Number of 41-Day Illnesses and Over	Number of Teachers Having 41-Day Illnesses and Over	Mean Number of 41-Day Illnesses and Over Per Teacher
		0	1	2	3	5			
20-24	100	95	5				5	5	.05
25-29	135	129	5		1		8	6	.06
30-34	132	122	10				10	10	.08
35-39	80	74	5	1			7	6	.09
40-45	70	60	9	1			11	10	.16
45-49	88	75	10	2		1	19	13	.22
50-54	134	122	9	3			15	12	.11
55-59	106	93	11	2			15	13	.14
60-64	63	56	6	1			8	7	.13
65-69	13	12	1				1	1	.08
Total	921	838	71	10	1	1	99	83	.11

Table 36 shows:

1. That the highest mean numbers of forty-one-day illnesses and over are found among teachers from forty to sixty-five years of age. The high mean for age group, 45-49, is due to one teacher who had five illnesses lasting longer than forty-one days.

TABLE 37
NUMBER OF FORTY-ONE-DAY ILLNESSES AND OVER PER TEACHER BY
AGE GROUPS FOR SIX YEAR PERIOD

Age	Total Number of Teachers	Teachers having 41- Day Illnesses and Over	Total Number of 41- Day Illnesses and Over	Mean Number of 41-Day Illnesses and over Per Teacher
20-39	447	27	40	.09
40-69	474	56	59	.12

Table 37 shows:

1. That more than twice as many teachers over forty years old had illnesses of forty-one days and over than did those twenty to forty years of age.
2. That the mean number of forty-one-day illnesses and over per teacher is higher for the older group of teachers than for the younger group.

Summary of Tables 24 to 37.

1. More teachers under forty years of age have half-day, one-day and two to five-day illnesses than those over forty years of age.
2. Seven more teachers under forty have twenty-one to forty-day illnesses than those over forty.
3. More teachers over forty years of age have illnesses lasting six to ten, eleven to twenty and forty-one days and over than those under forty years of age.
4. The illnesses of teachers under forty years of age are shorter than those of teachers over forty. For instance, teachers under forty years of age have more half-day, one-day and two to five-day illnesses than those over

forty while the teachers over forty have more illnesses lasting six to ten, eleven to twenty, twenty-one to forty and forty-one days and over.

7. The Relation of Age to the Seasonal Variation in Illness

a. The Amount of Illness

Tables 16 and 17, Chapter V,¹⁶ show that season as presented by months of the school year has a very definite influence upon the amount of illness of teachers and upon the number of teachers ill. It has also been shown that the age of teachers (*see* Tables 18 and 19) bears a significant relation to their illness. Therefore, it seems desirable to determine to what extent age contributes to the seasonal variation in illness.

TABLE 38

AVERAGE NUMBER OF DAYS ILL BY MONTHS AND AGE FOR SIX YEAR PERIOD
FROM SEPTEMBER 1924 TO JUNE 1930¹⁷

Age	Number of Teachers	Average Number of Days Ill Per Teacher									
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb. ¹⁸	Mar.	Apr.	May	June
20-24	100	.89	1.94	2.40	2.13	3.89	3.81	4.37	3.55	3.63	1.68
25-29	135	1.13	1.56	2.05	2.74	4.44	4.25	3.39	2.80	2.58	.93
30-34	132	1.52	2.02	1.99	2.24	3.21	3.63	2.77	2.62	2.58	1.14
35-39	80	1.68	2.48	3.36	2.54	3.74	4.33	3.88	3.14	2.30	1.00
40-44	70	1.92	2.78	3.37	3.66	5.11	4.31	3.41	2.83	2.90	2.10
45-49	88	1.66	2.46	3.09	4.97	5.44	5.70	5.49	5.33	3.32	1.43
50-54	134	1.81	2.35	2.60	2.90	3.36	4.65	3.88	3.56	3.36	1.98
55-59	106	1.90	2.00	2.88	3.33	4.57	4.80	4.14	3.96	3.34	1.98
60-64	63	1.81	2.06	3.43	4.54	3.63	5.58	3.51	3.57	2.24	1.70
65-69	13	1.99	3.26	3.46	3.35	4.98	2.59	2.51	1.74	2.73	2.17
Total	921	1.56	2.15	2.68	3.09	4.10	4.44	3.81	3.41	2.94	2.36

From Table 38 (*see* Figure 10), it appears that teachers from twenty to thirty-five years of age have fewer days of illness during September, October and November, except for the 55-59 age group during October, than those over thirty-

¹⁶ Pages 34, 37.

¹⁷ Complete table will be found in Appendix E.

¹⁸ Two cases in the 45 to 50 age groups have large amounts of illness in this month and swell this average. Page 41.

five years of age. This record also holds good for February. In January, however, one of these younger groups only, the 30-34 age group, is among those which have the lowest average for the whole number of teachers. The number of teachers in the 65-69 age group is too small to consider the results reliable.

Of the younger teachers those from twenty-five to thirty-five years old have the lowest average for March, April and June. The 35-40 age group must be added to this record for June.

The twenty to twenty-five year age group, which has a low average in the first four months of the year develops a comparatively high record as the school year advances. It appears that the endurance of this rather inexperienced group is not so great as that of the other age groups or that adjustment comes with greater experience. It would also be interesting to know to what extent this group indulges in the gayeties of the winter season in comparison with the twenty-five to thirty, and other age groups. A favorable age for few days of illness in several months, October, November, and December, among the older groups, is from fifty to fifty-five years of age or from fifty-five to sixty years of age. If there were sufficient number of cases in the sixty-five to seventy age group to consider the results reliable, it would appear that, when compared with the other groups, this group has its highest monthly average of illness in the first half of the school year and becomes adjusted so that it has a peculiarly low average for each of the following months in the year.

Though age does not appear to influence the seasonal distribution of illness, the effect of the season on illness, however, is clearly shown, by the increase in the monthly average of illnesses for each age group until the peak is reached in the winter months (*see* Figure 10).

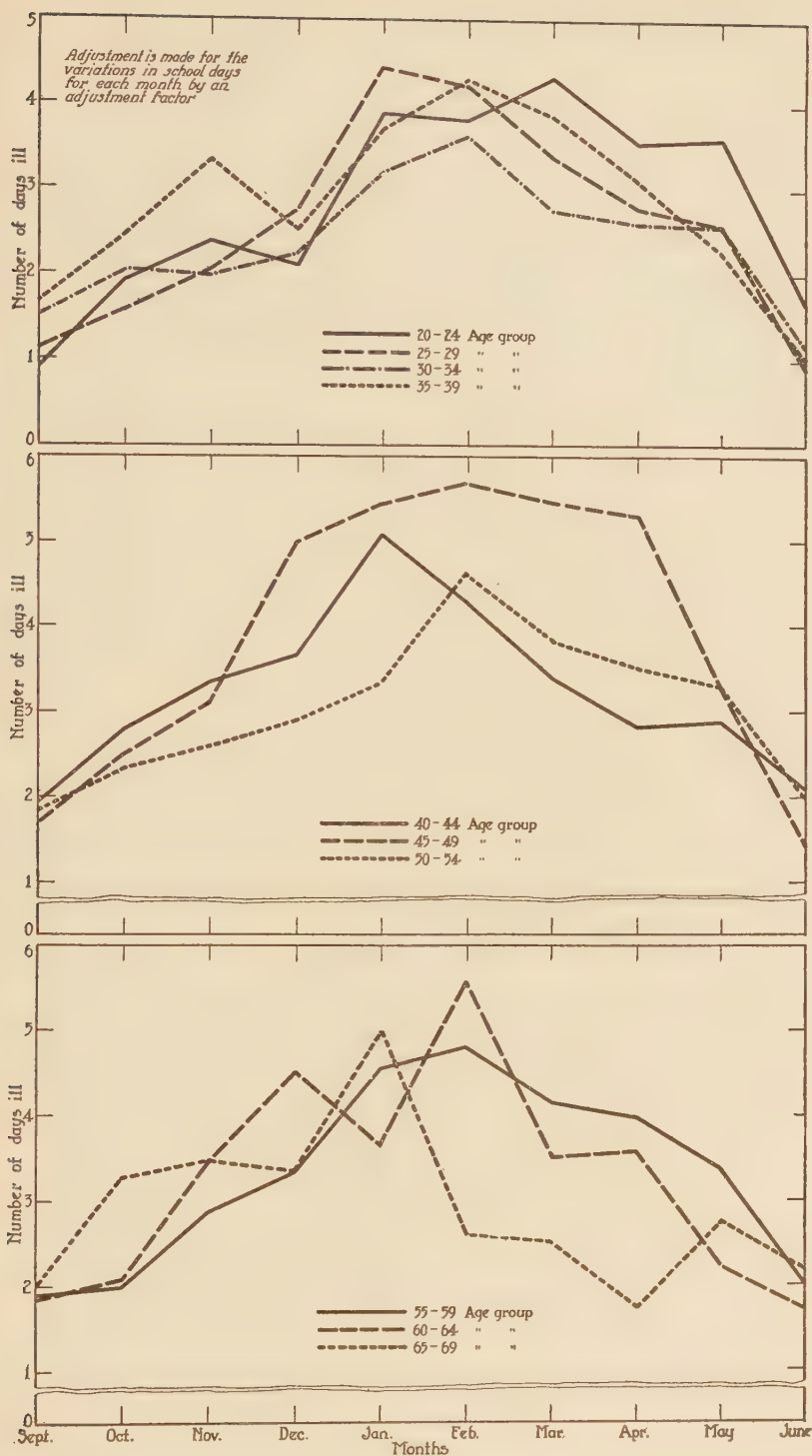


Figure 10. Average number of days ill by months and age for six year period

b. The Rate of Teachers Ill

It has been shown (*see* Table 17, Figure 6) that the number of teachers ill increases with the months of the school year until the peak is reached in February, and though there is a continual decrease in the number ill during the spring months the June rate of teachers ill is higher than that for September or October.

TABLE 39

RATE OF TEACHERS ILL BY MONTHS AND AGE FOR SIX YEAR PERIOD
FROM SEPTEMBER 1924 TO JUNE 1930¹⁹

Age	Total Number of Teachers	Rate per 100 of Teachers Ill									
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
20-24	100	31	43	60	61	69	70	63	66	58	58
25-29	135	23 *	31	45	61	52	65	51	49 *	45	44
30-34	132	31 *	33	42	53	52	61	51	54 *	39	35
35-39	80	25	37	56	53	57	59	60	56	44 *	27
40-44	70	30 *	30	51	42	48	60	45	41	32 *	42
45-49	88	35	34	47	59	54	63	53	44	42 *	29
50-54	134	31	29	38	43 *	45 *	54	47 *	47	39	42
55-59	106	29	33	47	48	49 *	62 *	42 *	45 *	38	51
60-64	63	22	28	40	52	51	57	38	39	36	31 *
65-69	13	27	34	46	45	51	40	41	16	28	56
All Ages	921	29	33 *	47	52 *	53	61	50	49	42	40 *

* Difference in one here is due to the fact that decimals were used in the calculation rather than whole numbers.

¹⁹ Complete table can be found in Appendix F.

With the exception of the 20-24 age group, the curves for the seasonal distribution of the number of teachers ill by age (*see* Table 39, Figure 11), show the influence of season rather than that of age. It will be seen that in the 20-24 age group there are more teachers ill each month than for any other age group. For the other age groups, however, there is no one that is consistently high or low. On the contrary, for each group there is a continuous rise in the rate of teachers ill from September throughout the winter months and a decrease in this rate for the spring months. This result agrees with the effect of season on the number of teachers ill (*see* Table 17, Figure 6).

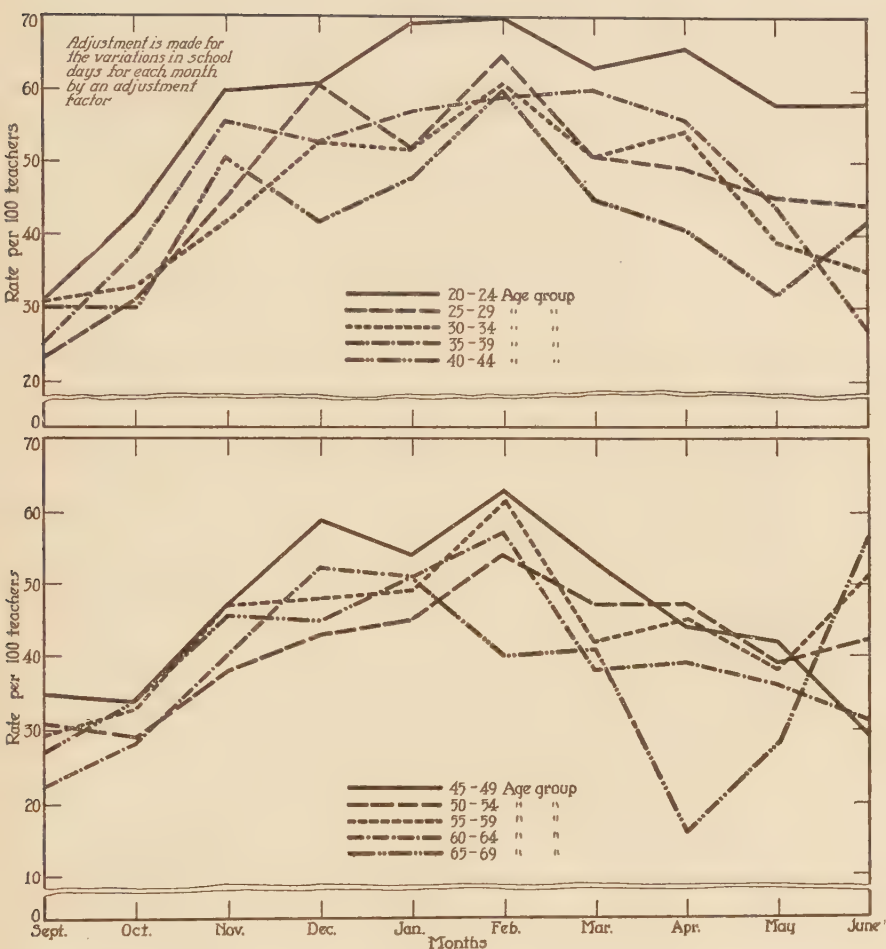


Figure 11. Rate of teachers ill by months and age for six year period

8. The Relation of Salary to the Amount of Illness

TABLE 40

DISTRIBUTION OF TEACHERS BY TOTAL DAYS ILL AND SALARY
FOR SIX YEAR PERIOD

Days Ill	Salary										Total
	1300- 1399	1400- 1499	1500- 1599	1600- 1699	1700- 1799	1800- 1899	1900- 1999	2000- 2099	2100- 2199	2200 and over	
0-.49	2	6	2	9	5	37	17	1			79
.5-.99		1		1			1				3
1-5	4	7	2	12	13	33	19	2			92
6-10	4	13	3	16	10	29	15	2			92
11-15	4	15	5	9	5	14	13				65
16-20	2	6	2	9	8	16	11	1	1		56
21-25	3	7	1	7	3	13	9				43
26-30	3	8	4	3	1	11	5				35
31-35	2	6	1	1	3	11	6	1			31
36-40	2	6	2	3	1	6	4				24
41-45	1	4	1	2	1	6	3				18
46-50		5	1		3	8	2				19
51-55		1		1	3	3	1				9
56-60	1	3		1	1	6	2				14
61-65				1		7	3				11
66-70	1	3				3	1	1			9
71-75			1		2	1	2				6
76-80		1			2	2	1				6
81 plus	3	7	2	3	10	29	7			1	62
Total	32	99	27	78	71	235	122	8	1	1	674
Means	32.27	32.22	30.84	19.89	38.12	34.88	25.84	18.06	18.5	141	30.96
Stan. Dev.	38.50	34.95	35.20	27.70	46.20	44.15	33.95	21.55	0.0	0.0	39.50

$$\text{Eta} = .146 \pm .025$$

The value of the correlation ratio, Eta, for the distribution of teachers by total days ill and salary (*see* Table 40), with the exception of the columns where the number of cases

is one each only, is $\sqrt{1 - \frac{1506.84}{1560.25}}$, or $.146 \pm .025$. This

result is slightly lower than the value for Eta when the two columns are retained.

Since there is a limit of \$1800 as the salary of classroom teachers in the elementary school and increases occur after the maximum is reached, if a teacher pursues courses that the Board of Education will credit, the distribution of teachers by amount of illness and salary banks up in the \$1800 and

\$1900 column. Table 5 also shows this tendency. One peculiarity of this distribution of total days' illness and salary is the low mean number of days' illness for salary column \$1600 to \$1700. The medians for this and the two adjacent columns have been found in order to see if they are a better measure of central tendency in these instances than the means. These results are given below in Table 41.

TABLE 41

MEANS AND MEDIANS OF DISTRIBUTION OF TOTAL DAYS ILLNESS
AND SALARY FOR SIX YEAR PERIOD

Salary 1400-1500			Salary 1500-1600		
No. of Teachers	Mean	Median	No. of Teachers	Mean	Median
99	32.22	22.07	27	30.84	19.75
Salary 1600-1700			Salary 1700-1800		
No. of Teachers	Mean	Median	No. of Teachers	Mean	Median
78	19.88	11.56	71	38.12	17.56

The median as well as the mean for column 4, 1600-1700, shows a much lower central tendency than that of the adjacent columns.

TABLE 42

DISTRIBUTION OF 674 TEACHERS BY AGE AND SALARY FOR SIX
YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Age	Salary										T'l
	1300-	1400-	1500-	1600-	1700-	1800-	1900-	2000-	2100-	2200	
20-24	38	44	2	1							75
25-29	3	45	16	29	7						100
30-34		6	9	30	31	18					94
35-39	1			8	17	24	5	1			56
40-44		1			5	19	19				44
45-49		3		3	4	30	24			1	65
50-54				5	5	55	34	4		1	104
55-59				1	1	49	26	2			79
60-64				1		34	12				47
65-69					1	6	2	1			10
Total	32	99	27	78	71	235	122	8	0	2	674

In an effort to account for the small number of teachers, twenty-seven only, receiving salary 1500 to 1600, a study of

the distribution of these teachers by age and salary was made (*see* Table 42). Of the teachers receiving average salaries of 1400 to 1499 and 1600 to 1699 for the six year period of this study there are four in the first group and ten at least in the second group who may be considered over-age for these groups. There are no over-age teachers in the group receiving an average salary of 1500 to 1599. The fact that there are no individuals who are not over-age in the last mentioned group does not account, however, for the unusually small number.

9. The Relation of Grade Taught to the Amount of Illness

TABLE 43

DISTRIBUTION OF 674 TEACHERS BY TOTAL DAYS' ILLNESS
AND GRADE FOR SIX YEAR PERIOD FROM
SEPTEMBER 1924 TO JUNE 1930

Number of Days Ill *	Kindergarten	First	Second & Third	Intermediate	Total
- 0	5	21	34	19	79
0-99	1	1		1	3
1-5	7	17	25	43	92
6-10	9	14	27	42	92
11-15	2	5	20	38	65
16-20	2	8	19	27	56
21-25	1	9	16	17	43
26-30	4	4	7	20	35
31-35	4	4	13	10	31
36-40	3	4	12	5	24
41-45		3	5	10	18
46-50	1	1	8	9	19
51-55		1	1	7	9
56-60		1	6	7	14
61-65		1	4	6	11
66-70		1	5	3	9
71-75	1	1	1	3	6
76-80				6	6
81 plus	5	11	20	26	62
Totals	45	107	223	299	674
Mean Days Ill	30.66	28.56	31.00	32.17	31.10
P. E. of Means	± 4.22	± 2.70	± 1.86	± 1.50	± 1.03

* The differences in the step interval in number of days ill vary and have been so treated in the calculation of the means.

The mean number of days ill by grade for the six year period is practically the same for the teachers of kindergarten, first, second and third and intermediate grades. Since age has been found to have a slight but significant effect upon the amount of illness (*see* Table 18), the mean age, has been found for the teachers of each of the four grade divisions given in Table 43, in order to determine if the mean age is practically the same for the teachers of each of these grade divisions. These results are given in Table 44.

TABLE 44

DISTRIBUTION OF 674 TEACHERS BY AGE AND GRADE FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Age	Grade				Total
	Kindergarten	First	Second & Third	Intermediate	
20-24	3	8	28	36	75
25-29	7	19	34	40	100
30-34	4	9	32	49	94
35-39	8	14	22	12	56
40-44	1	7	19	17	44
45-49	7	7	17	34	65
50-54	9	22	31	42	104
55-59	4	12	23	40	79
60-64	2	8	13	24	47
65-69	—	1	4	5	10
Total	45	107	223	299	674
Mean Age	42.06	42.64	40.71	42.25	41.79
P. E. of the Mean	± 1.17	± 0.84	± 0.12	± 0.53	± 0.34

Table 44 shows that the mean age of the teachers of the different grade groups is practically the same.

CHAPTER VI

THE RELATION OF PROMOTION AND MARITAL STATUS TO ILLNESS

I. The Relation of Promotion Previous to the Time of this Study to Illness

Elementary teachers in the Baltimore public schools usually enter the profession as grade teachers, but, as opportunity permits, outstanding teachers are promoted to higher positions of responsibility. In a study of the relation of promotion to illness certain questions arise, such as, do the additional responsibilities of the position to which the teachers are promoted increase the amount of illness, or does the fact of attainment of promotion relieve the strain of working toward a goal and, hence, make for better health? Does the fact that promoted teachers, principals and vice-principals since they are not engaged in classroom teaching, but give their time to administrative duties and to the supervision of teaching, make for more or less illness than is found among classroom teachers? Does it appear that healthier teachers are those who attain promotion?

In order to determine the relation of promotion to illness, teachers who had been promoted previous to this study were matched in two respects, age and experience, with regular classroom teachers chosen at random from the total population of 921 individuals. Teachers promoted at the beginning of this study, September 1924, may be defined as those holding principalships and vice-principalships. Non-promoted teachers are those who remained in classroom teaching receiving the regular increases in salary according to years of service and who were not advanced to positions, such as, that of principal or vice-principal, demonstration or training teacher. Since it has been found that age exerts a slight but significant influence on illness and, since experience has a high correlation with age, the influence of these two factors was eliminated by matching. Of the fifty-six teachers promoted previous to this study, forty-four were matched in

age and experience with non-promoted teachers. To whatever extent administrators regard health in making promotions seems minimized somewhat by the procedure of matching individuals at random from so large a total population.

TABLE 45

ILLNESSES OF 44 PRINCIPALS AND 44 CLASSROOM TEACHERS FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

	Principals	Classroom Teachers
Total Number	44	44
Total Number of Days Ill	624	1273
Average Number of Days Ill Per Teacher Per Year	2.36	4.82
Total Number of Illnesses	166	273
Average Number of Illnesses Per Teacher Per Year	.63	1.03
Average Duration of Illnesses in Days Per Teacher Per Year	3.30	5.34

Table 45 shows that the promoted teachers have less than half as many days of illness as the non-promoted, 624 and 1273 days respectively, and have an average of 2.36 days per year which is less than half the average, 4.82 days per year, of the non-promoted. Promoted teachers have an average of .63 illnesses per teacher per year, while non-promoted have 1.03 illnesses. It will also be seen that the promoted teachers when they are ill have an average of 3.3 days per illness while the non-promoted have an average of 5.3 days.

In order to determine the significance of the difference in the amount of illness and the number of times ill of principals and classroom teachers, these results were tested for errors due to sampling. For the total number of days ill of the principals and classroom teachers the

$$\frac{\text{Difference of the Proportion}}{\text{Difference of the Sigma of the Proportion}}, \frac{.0129386}{.000860}, = 15.045.^1$$

This result indicates that the difference in the number of days ill, or average number of days ill per teacher, would never be due to chance. In a similar test for the number of times ill of the principals and classroom teachers the

¹ For table see Appendix G.

$$\frac{\text{Difference of the Proportion}}{\text{Difference of the Sigma of the Proportion}}, \frac{.0042664}{.0005882}, = 7.253.^2$$

This difference, therefore, that exists between the number of times ill of principals, .63, and of classroom teachers, 1.03, is not due to sampling or chance.

Hart ³ states, in his study of the London teachers, "Taking into account the different age distributions of head teachers and assuming the assistants' law of illness applied, the number of days' illness a year expected was 9.00 whereas the actual result experienced was 6.86."

The additional responsibilities of the higher positions of the Baltimore teachers and the contacts that these positions of principalship require one to make with other adults, which are commonly considered strenuous, seem rather conducive to good health. On the other hand, few of the principals teach in the classroom, so the lack of the influence of classroom teaching may be responsible for their more favorable degree of health.

2. The Relation of Promotion During or Following the Years of This Study

To throw more light upon the factor of promotion, a study was made of the illnesses of teachers promoted during or since the period of this study.

Promoted teachers are those teachers who were advanced to positions of responsibility during or since the period of this study, September 1924 to 1930. Such positions include principalships, vice-principalships, and demonstration teaching. These teachers were regular grade teachers at the beginning of this study, September 1924, and some were grade teachers throughout the six years of this study for promotion came for them after the end of this period.

Non-promoted teachers are, as those in the preceding study, regular grade teachers who were not advanced to posi-

² For table see Appendix H.

³ Hart, J. Y., "An Investigation of the Illness Data of Elementary School Teachers in London 1904-1919," *Journal of the Royal Statistical Society*, LXXXV, Part III (May 1922), p. 346.

tions held by promoted teachers. It was possible to match, forty-four promoted teachers out of a total of sixty-seven with forty-four non-promoted teachers from the total population of 921 teachers in respect to age and experience.

TABLE 46

ILLNESSES OF 44 PROMOTED * AND NON-PROMOTED TEACHERS FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

	Promoted	Non-Promoted
Number of Teachers	44	44
Total Number of Days Ill	977	1478
Average Number of Days Ill Per Teacher Per Year	3.13	4.74
Total Number of Illnesses	251	429
Average Number of Illnesses Per Teacher Per Year	.80	1.38
Average Duration of Illnesses in Days Per Teacher Per Year	3.89	2.48

* Promotion took place during or after the period of this study.

Teachers promoted during and after this study (*see* Table 46), have therefore, fewer days of illness, 977 days, than those not promoted, who have 1478 illness days, so the average number of days ill 3.13 per teacher per year for those promoted is less than that for those not promoted, 4.74 days. Likewise the promoted teachers have the fewer illnesses per teacher per year, 0.80 in contrast to 1.38 for non-promoted teachers (*see* Table 46). The teachers promoted during and after this study, however, when ill have longer periods of illness, Table 46, than those not promoted, since their average duration of illness per teacher per year is 3.89 days and for the non-promoted the average duration is 2.48 days.

The differences in the total number of days ill, 977 and 1478 (*see* Table 46), and in the number of illnesses, 251 and 429 (*see* Table 46), for promoted and non-promoted teachers were tested for sampling errors. In testing the difference in the amount of illness, the

$$\frac{\text{Difference of the Proportion}}{\text{Difference of the Sigma of the Proportion}}, \frac{.009988}{.0009756}, = 10.2378.^4$$

⁴ For table *see* Appendix I.

This result indicates that the difference in the number of days ill for promoted and non-promoted teachers is reliable. In testing for sampling errors in the difference in the number of illnesses of promoted and non-promoted teachers, the

$$\frac{\text{Difference of the Proportion}}{\text{Difference of the Sigma of the Proportion}}, \frac{.0070973}{.001033}, = 6.871.^5$$

This difference in the average number of illnesses of promoted and non-promoted teachers is also reliable. It appears that the young outstanding teachers, or young teachers working toward promotion, work to a degree of disability that requires more time for recuperation than for those who do not receive promotion. This appears to be true for younger promoted teachers rather than for older promoted teachers, since Table 45 showed the average duration of illness for teachers promoted before this study was less than for the non-promoted. In two respects, the amount of illness and the frequency of illness, results for teachers promoted during this study and non-promoted teachers and for teachers promoted previous to this study and non-promoted teachers, agree. The two groups of promoted teachers (*see* Tables 45 and 46) could not be compared, however, since those promoted before this study (*see* Table 45) ranged in age from thirty-five to sixty-five and those promoted during or after this study (*see* Table 46) were from twenty to forty years of age. These results lead one to think that the sense of attainment and security of the older group, or that the elimination of teaching aids in reducing illness. At the same time the longer periods of illness of excellent teachers in line for promotion may be due to an extra effort to succeed, some of whom when they become older may be the ones who are forced to resign because of poor health and have left the ranks of the older promoted persons. Whether that be true or not, it is the health of the younger outstanding teacher who may be put into positions of responsibility that needs to be watched.

⁵ For table see Appendix J.

3. The Relation of Marital Status to Illness

Boards of Education have adopted various policies in regard to employing married teachers and have advanced different points of view on this subject. In Baltimore City teachers in the elementary schools automatically resigned when they married until the equalization law ⁶ was passed in 1925. After that time no teachers could be discriminated against. This study is concerned with one phase only of the question of married women teachers in the elementary school, their physical efficiency.

Since it was not until the year 1925 that married elementary teachers could retain their positions in the Baltimore City school system, this study, which covers the school years from September 1924 to June 1930, includes few married teachers. In the school year 1929-1930 there is the greatest number of married teachers, eighty-nine in all. For this one year it was possible to match twenty-eight of the total number of married teachers with the same number of unmarried teachers in respect to four factors, age, years of experience, salary and grade taught. Of the fifty-six teachers, twenty-eight married and twenty-eight unmarried, three of each group taught first grade, eleven of each taught second or third grade and fourteen of each taught intermediate grades. Teachers who were on maternity leave ⁷ had been eliminated previously.

TABLE 47

ILLNESSES OF 28 MARRIED AND 28 SINGLE TEACHERS FOR THE SCHOOL YEAR 1929-1930

	Married Teachers	Single Teachers
Number of Teachers	28	28
Total Number of Days Ill	155	100
Mean Number of Days Ill Per Teacher Per Year	5.36	3.57
Total Number of Times Ill	53	40
Mean Number of Times Ill Per Teacher Per Year	1.89	1.43
Mean Duration of Illness Per Teacher Per Year	2.92	2.50

⁶ Bagby, G. B., *Annotated Code of the Public General Laws of Maryland*, II (Article 77, Section 91), p. 2472.

⁷ Chap. III, p. 11.

The mean number of days ill for married teachers (*see* Table 47), 5.36 days, is greater than that for single teachers, which is 3.57. This mean number for married teachers is also greater than the mean number of days ill for the total number of teachers, 4.99 days,⁸ however, it is not so great as the mean days ill for the school year 1929-1930 which is 5.88 days.⁹

Likewise the mean number of times ill for married teachers, 1.89 times, is greater than the mean number of times ill for single teachers, 1.43, and it is also greater than the mean number of times ill for the total population, 1.24 times.¹⁰ The mean duration of illness for married teachers is 2.92 days, which is greater than that, 2.50 days, for single teachers.

The differences in the number of days of illness for married and single teachers, 155 and 100 days respectively, and the number of times ill, 53 and 40, for married and single teachers respectively (*see* Table 47) were tested for reliability. For the difference in the number of days ill for the married and single teachers the

$$\frac{\text{Difference of the Proportion}}{\text{Difference of the Sigma of the Proportion}}, \frac{.0103384}{.0009770}, \text{ equals } 1.05.^{11}$$

For the difference in the number of times ill for the two groups the

$$\frac{\text{Difference of the Proportion}}{\text{Difference of the Sigma of the Proportion}}, \frac{.00488722}{.0025400}, \text{ equals } 1.92.^{12}$$

These results show that the difference between the number of days ill and between the number of times ill for married and single teachers may be due to chance. This unreliability of the results may be due to the small number of married teachers that this study afforded.

Carrothers¹³ found that married teachers had a greater amount of illness and were ill more frequently than single teachers.

⁸ Chap. IV, p. 24.

⁹ Chap. IV, p. 24.

¹⁰ Chap. IV, p. 27.

¹¹ Appendix K.

¹² Appendix L.

¹³ Carrothers, G. E., *op. cit.*, p. 35.

CHAPTER VII

CONCLUSIONS

From the facts disclosed by this study one may draw certain conclusions which are listed below in respect to the illness of women teaching in the white elementary schools of Baltimore City. Some of these conclusions accord with those of others who have investigated the illnesses of women teachers.

The Amount of Illness

1. The Baltimore teachers have few absences from school due to illness.
 - a. The mean number of days' illness is five days per teacher per school year (*see* Table 9).
 - b. Almost one eighth (11.7%) of the total number of teachers have no record of illness during six years (*see* Table 8).
 - c. One fourth of the teachers have an average of less than one day of illness a year. Almost half the group, 49%, have an average of less than three days' illness a year (*see* Table 8).

The Frequency of Illness

2. The Baltimore teachers are ill infrequently.
 - a. The mean number of times ill is 1.24 per teacher per year. Fifty per cent are ill 1.17 times, or fewer, per year (*see* Tables 12 and 13).

The Average Duration of Illness and the Actual Periods of Illness

3. The Baltimore teachers have illnesses of short duration, necessitating short absences from school.

The average duration of illness per year for these teachers is four days (*see* Table 14). Of the actual periods of illness, the shorter ones occur most frequently. There-

fore, one day illnesses are more common than two to five day illnesses, two to five are more common than six to ten, and so on (*see* Table 15).

The Relation of the Month of the Year to Illness and to the Number of Teachers Ill

4. The season of the year directly influences, first, the amount of illness of the Baltimore teachers, and, second, the number of teachers ill.
 - a. The number of days of illness presents a curve with its highest peak in the winter months, January and February. The average number of days ill per teacher is almost three times as great in February as in September, the number of days being 4.45 and 1.56 for the two months respectively (*see* Table 16). The average number of days ill per teacher for June, 2.36, is higher than that for the months of September and October, 1.56 and 2.15 respectively.
 - b. The number of teachers ill for each month of the school year varies directly with the amount of illness (*see* Table 17). This result follows closely the curves showing morbidity and mortality rates by months. It appears, therefore, that the rate of teachers ill in the last months of the school year, April, May, and June, 49, 42 and 40 per 100, though greater than that in September and October, 29 and 33 per 100 respectively, is due to the effect of the season rather than to an accumulation of fatigue caused by the profession itself.

The Relation of Age to the Amount, the Frequency and the Duration of Illness

5. The age of a teacher affects the number of days and the number of times that she is ill and the length of her illnesses.
 - a. The number of days of illness increases with age.

The correlation ratio for the amount of illness and age was found to be $.202 \pm .025$ (*see* Table 18).

When the teachers were divided into two groups, that is, those under forty years of age and those over forty, it was found that the average number of days ill for the younger group lies below the mean for the total population, five days per teacher per year (*see* Table 9), but, for the older group it lies above this mean (*see* Table 19). The actual difference in the number of days ill for the two groups is 1.03 per teacher per year. According to the Chi Square test this difference is 17.28 greater than zero.

- b. The frequency of illness varies inversely with age. Younger teachers are ill more often than older ones. The correlation ratio for the distribution of teachers by number of times ill and age is $.249 \pm .024$ (*see* Table 20). When the teachers were divided into two groups according to whether they were under or over forty years of age, the mean number of times ill for the younger group lies above the mean for the total population, 1.24, and the mean for those over forty years of age lies below this mean (*see* Table 21). The Chi Square test applied to the difference in the number of times ill for the two groups gives a result of 6.03.
- c. The duration of illness increases with age. When older teachers are ill, they are sick for longer periods of time than younger teachers. The correlation ratio for the distribution of age by average duration of illness equals $.173 \pm .025$ (*see* Table 22). The mean duration of illness for teachers in the age periods under forty years of age is less than the mean for the total population, 4.0 days per teacher per year. For those over forty the mean is higher than that for the whole population. Teachers in the 20-24 age groups have the shortest illnesses (*see* Table 23).
- d. In respect to the actual length of illnesses, a greater number of teachers under forty years of age have ill-

nesses lasting less than six days, such as, illnesses of half a day, one day, or two to five days, than do teachers over forty years old. More teachers over forty have illnesses lasting longer than six days than do those under forty (*see* Tables 24-37).

- e. Teachers under forty years of age have a greater number of illnesses lasting less than six days than teachers over forty (*see* Tables 24-37). Teachers over forty years of age have a greater number of illnesses lasting six days and longer than those under forty (*see* Tables 24-37).

The Relation of Age to the Seasonal Variation in Illness

6. Age appears to have no affect upon the seasonal distribution of illness, either in respect to the amount of illness or to the number of teachers ill, with the exception of teachers twenty to twenty-five years of age.
 - a. The 20-25 age group has a low average for each of the first four months of the year, 0.89, 1.94, 2.40, 2.13, but develops a rather high average for the months from January to May inclusive, the averages being 3.89, 3.81, 4.37, 3.58, 3.63 respectively. The 30-35 age group has a continuously lower mean number of days ill than any one of the other groups. (*see* Table 38).
 - b. The teachers in age group 20-24, show the highest rate of teachers ill for every month of the year. It appears that this young group lacks endurance or needs to adjust to the profession of teaching (*see* Table 39).

The Relation of Grade Taught to the Amount of Illness

7. The grade that a teacher teaches appears to have no influence upon the number of days that she is ill (*see* Table 43).

The Relation of Promotion to Illness

8. Principals appear more healthy than classroom teachers.
 - a. Principals average 2.36 days' illness per year as compared with an average of 4.82 days per year for classroom teachers. The Chi Square test of the reliability of the difference in the number of days ill gives 15.045 (*see* Table 45, p. 69).
 - b. Principals average 0.63 times ill per year as compared with 1.03 times for classroom teachers. The Chi Square test for the difference in the number of times ill gives 7.253 (*see* Table 45, p. 70).
 - c. The principals have an average duration of illness of 3.30 days per teacher per year as compared with 5.34 days for classroom teachers.

Explanations of this situation suggest that administrators select teachers who have few illnesses for promotion, that more of the stronger teachers avail themselves of opportunities for promotion, that the administrative duties of principalship exert less strain on an individual's health than classroom teaching, or that the sense of attainment or security that principals feel may be an important factor in promoting their health.
9. Promoted teachers have fewer days of illness and are ill less frequently than non-promoted teachers, but, when they are ill, they are sick longer than those not promoted.
 - a. The teachers promoted during the period of this study, or subsequent to it, average 3.13 days ill per year as compared with 4.74 days for teachers not promoted. The Chi Square test for the reliability of the difference in number of days ill gives 10.2378 (*see* Table 46, p. 71).
 - b. The promoted teachers average 0.80 times ill per year as compared with 1.38 times for non-promoted teachers. The Chi Square test for the reliability of the difference in number of times ill gives 6.871 (*see* Table 46, p. 72).

- c. The promoted teachers, however, have an average duration of illness of 3.89 days per teacher per year while non-promoted teachers have an average of 2.48 days per year (*see* Table 46).

The fewer days and the lower frequency of illness of the promoted teachers, combined with their higher average duration of illness, seem to indicate that these teachers do not regard slight indispositions, so that when they are ill they require longer periods of time to recuperate.

The Relation of Marital Status to Illness

10. Married teachers average 5.36 days' illness per year (*see* Table 47), as compared with 3.57 for single teachers. The Chi Square test for the reliability of this difference in number of days' illness gives 1.05. Table 47, p. 74. Married teachers average 1.89 times ill per year as compared with 1.43 for single teachers. The Chi Square test of the difference in number of times ill gives 1.92 (*see* Table 47, p. 74). Married teachers have an average duration of illness of 2.92 days per year as compared with 2.50 days for single teachers (*see* Table 47). The small number of married teachers studied may account for the unreliability of the difference in the figures for married and single teachers.

CHAPTER VIII

RECOMMENDATIONS AND FURTHER STUDIES

The materials and the results of this study suggest certain questions or problems for further study rather than recommendations. Some of these problems are the following: Are the more frequent short illnesses of the younger teachers less or more detrimental to the advancement of pupils than the less frequent but longer periods of illness of the older teachers? What influence has the larger number of ill teachers in the twenty to twenty-four year age group upon the advancement of pupils and so upon the economy with which the school program is administered? Is there some factor in the beginning teaching experience which causes the greater amount of illness in the twenty to twenty-four age period? Does experience "season" one to the influences that cause more illness at the beginning of teaching or do social attitudes wane, consume less time and less physical strength? The number of individuals in this study in the sixty-five to seventy age period was too small to consider results significant and not due to chance. A more complete study of the illness of this age group may throw light upon the desirability of retirement at seventy years or at some other age.

Certain problems that seemed to the author particularly important could not be undertaken because of insufficient data. As mentioned previously the records of illness¹ do not include the type of disability from which the teacher is suffering. For the longer illnesses physicians' certificates may furnish names of diseases, but the principals' reports seldom include these data. Even though such records in some instances may not be without errors, a study of the incidence of various diseases would aid in furnishing material for:

1. A comparative study of the illnesses of Baltimore teachers with the illnesses of teachers of other places where such studies have been made.
2. A study of the environmental conditions commonly

¹ Chap. III, p. 13.

associated with certain diseases in relation to the diseases of Baltimore teachers.

3. A study of the factors inherent in the profession of teaching which may contribute to the various diseases of teachers.
4. A study of the prevailing diseases found among teachers and pupils in the same classroom.
5. More accurate information in regard to disability due to accidents as distinct from illness.
6. Some knowledge of the more prevalent illnesses of teachers and those disabilities which particularly handicap the teacher leading to a better selection of candidates for the profession. This statement refers to an even further elimination than that which has already been accomplished by the standards² set up for admission to teachers colleges and to the school system.

The suggested studies that precede require a knowledge of kinds of illnesses from which teachers suffer. Besides these there is an additional study which would contribute to our knowledge of the effects of illness. This is:

A study of the relative achievement of pupils associated with teachers having the same amount of illness but with different distributions of this illness, i. e., a few long periods of illness contrasted with a number of short periods.

² See Appendix A.

APPENDIX A

STATE TEACHERS COLLEGE AT TOWSON, MARYLAND

Defects That May Impair the Eligibility of Candidates for Permanent Appointment

Skin and Body :	Any chronic disease of the skin. Any communicable disease of the skin. Any gross or unsightly blemishes of the skin.
Posture :	Any marked deformity.
Nutrition :	Physiological undernutrition of 20% or more below standard. Obesity of 20% above standard.
Voice :	Must be free from any impediment in speech or any markedly unnatural tone.
Throat :	Any disease of the larynx or vocal cords. Any chronically infected or diseased tonsils should be removed before a permanent appointment, and if not, should only be acceptable if culture tests are negative.
Teeth :	Any marked disease of the nasal passages or sinus. Lack of oral hygiene, such as caries and infected teeth and gums must be treated before permanent appointment be granted.
Ears :	Any defect in hearing noted by whispered voice test should have an additional 2A Audiometer test. Any defect in hearing of 35% or over with indications of progressive deafness, unilateral as well as bilateral.
Eyes :	Loss of one eye. Any infection of the superficial or deep tissues of the eye. Any marked muscular defect, such as squint or nystagmus. Any defect in vision that cannot be corrected with glasses to at least 20/40 of normal vision.
Chest :	Tuberculosis, active or quiescent, of the lungs or pleura. Asthma (if attacks are frequent or severe). Tumor of the breast only if definitely malignant.
Heart :	Any organic lesion with decompensation. Any organic lesion with hypertrophy, the point of maximum impulse being at or outside the anterior axillary line. Compensated organic lesions, such as : Mitral stenosis. Aortic stenosis. Aortic insufficiency. Auricular fibrillation.

- Congenital lesions causing symptoms.
- Myocardial degeneration.
- Bradycardia due to heart block.
- Tachycardia (pulse rate above 100 after 10 min. recumbency) taken on 2 successive occasions.
- Aneurysm.
- Hypertensive cardio-vascular disease.
- Mitral insufficiency well compensated may be given annual provisional appointment for a period of three years, before permanent appointment is considered.
- Gastro Intestinal: All acute conditions require reexamination.
- All chronic disturbances.
- Grossly enlarged liver or spleen.
- Inguinal or femoral hernia unless truss is worn.
- Genito Urinary: Nephritis, Pyelitis, Cystitis, Urethritis, Chronic Prostatitis, Dysmenorrhea, Neoplasms.
- Nervous System: Pulse rate exceeding 100 per minute after 10 minutes recumbency.
- Locomotor ataxia, Spastic Paralysis due to apoplexy and all organic lesions of the central nervous system.
- A history within year of hysteria or of nervous breakdown.
- Any organic disease of the nervous system.
- Bones and Joints: Disease of bones:
 - (a) Tuberculosis conditions and non-tuberculosis conditions which still show some signs of activity.
- Infectious arthritis which is active.
- Congenital anomalies which interfere with function or because of their cosmetic effect:
 - (a) Hair lip.
 - (b) Cleft palate.
 - (c) Deformities of the upper extremities.
 - (d) Deformities of the lower extremities which cause a marked limp.
- Marked curvature of the spine which cannot be corrected.
- Amputations:
 - (a) Upper extremities.
 - (b) Lower extremities of a sufficient grade to cause a disability in gait.
- Any condition which requires crutches, canes, and braces.
- Flat feet:
 - (a) A student with simple flat feet which will respond to treatment such as exercise and supports should not be rejected.
 - (b) A student with rigid flat feet should be put on probation until one can determine their response to treatment. If they do not respond the student should be considered ineligible.

APPENDIX B

SCHOOL DAYS AND ADJUSTMENT FACTOR FOR MONTHS

Average School Days Per Month Per Year	Adjustment Factor	
September	17	1.176
October	23	.882
November	20	1.000 (Thanksgiving holiday)
December	17	1.176 (Christmas holiday)
January	21	.952 (New Year's Day for five years)
February	19	1.052 (Washington's Birthday)
March	23	.882 (Easter March 31, 1929)
April	19.5	1.026 (Easter holiday for five years)
May	22	.909 (Memorial Day holiday)
June	11	1.818

APPENDIX C

TABLE 48

FIGURES USED IN CALCULATING THE RELIABILITY OF THE DIFFERENCE
IN DAYS ILL FOR AGE GROUPS

Age	Teachers	Total Days Per Number of Teachers Per Six Years	Days Ill Per Number of Teachers Per Six Years
40-69	474	540360	15576
20-39	447	509580	11943
Total	921	1049940	27519

APPENDIX D

TABLE 49

FIGURES USED IN CALCULATING THE RELIABILITY OF THE DIFFERENCE
IN TIMES ILL FOR AGE GROUPS

Age in Years	Teachers	Possible Times Ill Per Number of Teachers Per Six Years	Times Ill Per Number of Teachers Per Six Years
40-69	474	270180	3786
20-39	447	254790	3088
Total	921	524970	6874

APPENDIX E

TABLE 50

AVERAGE NUMBER OF DAYS ILL BY MONTHS AND AGE FOR SIX YEAR PERIOD FROM SEPTEMBER 1924 TO JUNE 1930

Age	Number of Teachers	Days Ill	Month											
			Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June		
20-24	100	Total	76	220	240	181	409	362	495	346	398	143		
		Average per Teacher	.76	2.20	2.40	1.81	4.09	3.62	4.95	3.46	3.98	1.43		
		*Adjusted Av. per Teacher	.89	1.94	2.40	2.13	3.89	3.81	4.37	3.55	3.62	1.68		
25-29	135	Total	130	238	277	315	630	546	519	368	383	107		
		Average per Teacher	.96	1.76	2.05	2.33	4.67	4.04	3.84	2.73	2.84	.79		
		Adjusted Av. per Teacher	1.13	1.56	2.05	2.74	4.44	4.25	3.39	2.80	2.58	.93		
30-34	132	Total	171	303	263	251	445	415	415	337	374	128		
		Average per Teacher	1.30	2.30	1.99	1.90	3.37	3.45	3.14	2.55	2.83	.97		
		Adjusted Av. per Teacher	1.52	2.02	1.99	2.24	3.21	3.63	2.77	2.62	2.58	1.14		
35-39	80	Total	114	225	266	173	314	322	352	245	202	68		
		Average per Teacher	1.42	2.81	3.36	2.16	3.92	4.02	4.40	3.06	2.52	.85		
		Adjusted Av. per Teacher	1.68	2.48	3.36	2.54	3.74	4.33	3.88	3.14	2.30	1.00		
40-44	70	Total	114	221	236	218	376	287	275	193	223	125		
		Average per Teacher	1.63	3.16	3.37	3.11	5.37	4.10	3.87	2.76	3.19	1.79		
		Adjusted Av. per Teacher	1.92	2.78	3.37	3.66	5.11	4.31	3.41	2.83	2.90	2.10		
45-49	88	Total	124	245	272	372	503	477	548	457	321	107		
		Average per Teacher	1.41	2.78	3.09	4.22	5.72	5.42	6.23	5.19	3.65	1.22		
		Adjusted Av. per Teacher	1.66	2.46	3.09	4.97	5.44	5.70	5.49	5.33	3.32	1.43		
50-54	134	Total	206	246	349	330	473	592	590	465	496	226		
		Average per Teacher	1.54	2.66	2.60	2.46	3.53	4.42	4.40	3.47	3.70	1.60		
		Adjusted Av. per Teacher	1.81	2.35	2.60	2.90	3.36	4.65	3.88	3.56	3.36	1.98		
55-59	106	Total	171	240	395	300	509	484	497	409	389	178		
		Average per Teacher	1.61	2.26	2.88	2.83	4.80	4.57	4.69	3.86	3.67	1.68		
		Adjusted Av. per Teacher	1.90	2.00	2.88	3.33	4.57	4.80	4.14	3.96	3.34	1.98		
60-64	63	Total	97	147	216	243	240	334	251	219	155	91		
		Average per Teacher	1.54	2.33	3.43	3.86	3.81	5.30	3.98	3.48	2.46	1.44		
		Adjusted Av. per Teacher	1.81	2.06	3.43	4.54	3.63	5.58	3.51	3.57	2.24	1.70		
65-69	13	Total	22	48	45	37	68	32	37	22	39	24		
		Average per Teacher	1.69	3.69	3.46	2.85	5.23	2.46	2.85	1.69	3.00	1.85		
		Adjusted Av. per Teacher	1.99	3.26	3.46	3.35	4.98	2.59	2.51	1.74	2.73	2.17		
Total	921	Total	1225	2244	2472	2420	3967	3891	3975	3061	2980	1197		
		Average per Teacher	1.33	2.44	2.68	2.63	4.30	4.22	4.32	3.32	3.24	1.30		
		Adjusted Av. per Teacher	1.56	2.15	2.68	3.09	4.10	4.44	3.81	3.41	2.94	2.36		

* Adjusted Average—Adjustment is made for the variation in school days in each month by use of an adjustment factor. The number of school days used as a basis is twenty per month.

APPENDIX F

TABLE 51

RATE OF TEACHERS ILL BY MONTHS AND AGE FOR SIX YEAR PERIOD FROM
SEPTEMBER 1924 TO JUNE 1930 †

Age	Total No. of Teachers	Rate per 100 Teachers	No of Teachers Ill									
			Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
20-24	100	Actual Rate	26	49	60	52	73	67	71	64	64	32
		Adjusted Rate	31	43	60	61	69	70	63	66	58	58
25-29	135	Actual Rate	19	35	45	52	55	62	58	47	50	24
		Adjusted Rate	23*	31	45	61	52	65	51	49*	45	44
30-34	132	Actual Rate	27	37	42	45	55	58	58	52	43	19
		Adjusted Rate	31*	33	42	53	52	61	51	54	39	35
35-39	80	Actual Rate	21	42	56	45	60	56	68	55	49	15
		Adjusted Rate	25	37	56	53	57	59	60	56	44*	27
40-44	70	Actual Rate	26	34	51	36	50	57	51	40	36	23
		Adjusted Rate	30*	30	51	42	48	60	45	41	32*	42
45-49	88	Actual Rate	30	39	47	50	57	60	60	43	47	16
		Adjusted Rate	35	34	47	59	54	63	53	44	42*	29
50-54	134	Actual Rate	26	33	38	37	48	51	54	46	43	23
		Adjusted Rate	31	29	38	43*	45*	54	47*	47	39	42
55-59	106	Actual Rate	25	38	47	41	52	58	47	43	42	28
		Adjusted Rate	29	33	47	48	49*	62*	42*	45*	38	51
60-64	63	Actual Rate	19	32	40	44	54	54	43	38	40	17
		Adjusted Rate	22	28	40	52	51	57	38	39	36	31*
65-69	13	Actual Rate	23	38	46	38	54	38	46	15	31	31
		Adjusted Rate	27	34	46	45	51	40	41	16	28	56
All Ages	921	Actual Rate	24	38	47	45	56	58	57	48	46	22
		Adjusted Rate	29	33*	47	52*	53	61	50	49	42	40*

* Difference of 1 here—due to the fact that the decimals were used in the calculation rather than the whole numbers.

† Adjusted Rate—adjustment is made for the variation in school days in each month by use of an adjustment factor on the basis of twenty school days per month.

APPENDIX G

TABLE 52

FIGURES USED IN CALCULATING THE RELIABILITY OF THE DIFFERENCE
IN DAYS ILL FOR PRINCIPALS AND CLASSROOM TEACHERS

	Teachers	Total Days Per Number of Teachers Per Six Years	Days Ill Per Number of Teachers Per Six Years
Principals	44	50,160	624
Classroom Teachers	44	50,160	1273
Total	88	100,320	1897

APPENDIX H

TABLE 53

FIGURES USED IN CALCULATING THE RELIABILITY OF THE DIFFERENCE
IN TIMES ILL FOR PRINCIPALS AND CLASSROOM TEACHERS

	Teachers	Possible Times Ill	Times Ill
Principals	44	25,080	166
Classroom Teachers	44	25,080	273
Total	88	50,160	439

APPENDIX I

TABLE 54

FIGURES USED IN CALCULATING THE RELIABILITY OF THE DIFFERENCE
IN DAYS ILL FOR PROMOTED AND NON-PROMOTED TEACHERS

	Teachers	Total Days Per Number of Teachers Per Six Years	Days Ill Per Number of Teachers Per Six Years
Promoted	44	50,160	977
Non-Promoted	44	50,160	1478
Total	88	100,320	2455

APPENDIX J

TABLE 55

FIGURES USED IN CALCULATING THE RELIABILITY OF THE DIFFERENCE
IN TIMES ILL FOR PROMOTED AND NON-PROMOTED TEACHERS

	Teachers	Possible Times Ill Per Number of Teachers Per Six Years	Times Ill
Promoted	44	25,080	251
Non-Promoted	44	25,080	429
Total	88	50,160	680

APPENDIX K

TABLE 56

FIGURES USED IN CALCULATING THE RELIABILITY OF THE DIFFERENCE
IN DAYS ILL FOR MARRIED AND SINGLE TEACHERS

	Teachers	Total Days Per Number of Teachers For One Year	Days Ill Per Number of Teachers For One Year
Married	28	5,320	155
Single	28	5,320	100
Total	56	10,640	255

APPENDIX L

TABLE 57

FIGURES USED IN CALCULATING THE RELIABILITY OF THE DIFFERENCE
IN TIMES ILL FOR MARRIED AND SINGLE TEACHERS

	Teachers	Total Times Ill Per Number of Teachers For One Year	Actual Times Ill Per Number of Teachers For One Year
Married	28	2,660	53
Single	28	2,660	40
Total	56	5,320	93

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VITA

Though born in Baltimore, Anita Shemwell Dowell spent most of her childhood in Prince Frederick, Maryland. After attending the public elementary school at Prince Frederick, Maryland, for four years and receiving instruction from a private tutor, she entered the Girl's Latin School in Baltimore from which she was graduated after three years. Four years later she received the degree of Bachelor of Arts from Goucher College where she had majored in biological sciences. She studied at Teachers College, Columbia University, from which she was graduated with the degree of Master of Arts and the diploma in the Supervision of Health Education. She was a graduate student in the Department of Biology at The Johns Hopkins University for a year and later entered the School of Higher Studies in Education, pursuing courses in the School of Hygiene and Public Health of The Johns Hopkins University as well as in Education. She received the degree of Doctor of Philosophy in March, 1934.

Miss Dowell taught for short periods in the public schools of Calvert and Harford Counties. For a few years she conducted a private elementary school in Prince Frederick, Maryland, from which she was appointed as a teacher in both the college and the demonstration school of the State Teachers College at Towson, Maryland. Since 1920 she has been instructor in health education and chairman of the health education committee in the college. In 1924 she was made assistant to the president at the Towson State Teachers College. She also taught at the college during eight summer sessions. During the summer of 1929 she lectured, under the direction of the Commonwealth Fund of New York City, in health education at Oregon State Agricultural College, at Monmouth Normal School, Monmouth, Oregon, and to workers in the Marion County Health Demonstration at Salem, Oregon.

While a student at Goucher College, Miss Dowell received

the scholarship offered by the college for summer study at the Marine Biological Laboratories, Woods Hole, Massachusetts. In 1925 she was awarded the European Travelling Fellowship for the study of health education in European schools which was offered by the American Child Health Association¹ to members of the health education faculties of normal schools and teachers colleges affiliated with the American Association of Teachers Colleges. "Report on European Travelling Fellowship in Health Education, 1925" published by the American Child Health Association, New York City, was condensed from the report submitted by Miss Dowell. Miss Dowell is joint author with Dr. Mary E. Spencer, of "Health Education in the State Normal School at Towson, Maryland," published by the Metropolitan Life Insurance Company.

Miss Dowell is a member of Chi Chapter of the Pi Lambda Theta Fraternity, and a member of Alpha Chapter of the Phi Beta Kappa Fraternity, The Johns Hopkins University.

¹ The fund of one thousand dollars for this fellowship was given by the Metropolitan Life Insurance Company, of New York City, to the American Child Health Association.

